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Advanced Placement and Dual Enrollment Courses
for Economically Disadvantaged Students and 2-Year Completion Rates at
Tennessee Public Higher Education Institutions

A dissertation
presented to
the faculty of the Department of Educational Leadership and Policy Analysis
East Tennessee State University

In partial fulfillment
of the requirements for the degree
Doctor of Education in Educational Leadership

by
Mia K. Hyde
August 2020

Dr. Virginia Foley, Chair
Dr. Debra Bentley
Dr. John Boyd
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Keywords: Advanced Placement, Dual Enrollment, Economically Disadvantaged

ABSTRACT

Advanced Placement and Dual Enrollment Courses
for Economically Disadvantaged Students and 2-Year Completion Rates at
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by
Mia K. Hyde

The purpose of this study was to measure the possible relationship between Advanced Placement and dual enrollment courses for economically disadvantaged students on 2-year completion rates at public Tennessee higher education institutions. A quantitative, quasi experimental, comparative design was used to analyze secondary data to determine if there is a relationship between Advanced Placement, dual enrollment courses, and 2-year completion rates for students in Tennessee community colleges and public universities. The sample for this study consisted of students who entered a Tennessee community college or Tennessee public university in the Fall of 2015. These students had taken at least one Advanced Placement or dual enrollment course in a Tennessee high school. In addition, the sample for this study was economically disadvantaged using the Tennessee method for direct certification when taking an Advanced Placement or dual enrollment course. The researcher observed that economically disadvantaged students are significantly less likely to attain completion in two years as compared to noneconomically disadvantaged students. The researcher also observed that economically disadvantaged students who receive credit in an AP math or English class are significantly more likely than economically disadvantaged students who did not receive credit in an AP math or English class to complete a degree in two years. The researcher also observed that economically disadvantaged

students who participated in a dual enrollment course are significantly less likely to attain completion in two years than noneconomically disadvantaged students, however if economically disadvantaged students receive credit in a dual enrollment course they are significantly more likely to complete a degree in two years.

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DEDICATION

I dedicate this work to all of those who have supported me throughout this journey. First, to my family. The love and guidance of my Granddad and Nana in my youth provided me a firm foundation from which I was able to build a beautiful life. They instilled in me values and wisdom that I have had to call upon many times throughout my life, but especially, through the last few years. To my Mom, Donna Thomas, you raised me to be strong, to believe in myself, and to go after what I wanted. You have been a great support to me throughout this process. To the rest of my family, thank you for your kind words of encouragement and support.

Second, I dedicate this work to my three sons. Thomas, Samuel, and Joshua, you are everything to me. You boys make me a better person and I am so honored to be your mom. I hope that in the last few years you have seen me try to provide for you, and further my knowledge and career, as a model for hard work and perseverance. It has been my upmost joy to watch you boys grow and I hope that you have seen me grow over the last few years as well. I know that God has great things planned for you boys and I cannot wait to see them!

Third, I dedicate this work to my friends. I am very fortunate to have life-long friends who have seen me through both highs and lows. Friends who love me, even with all my flaws! Friends who support me, even when I do not have the strength to go forward. And friends who tell me to quit complaining! Heather Hanks, April Bragg, Dawn Lim, Amanda Waddell, and Hope Malone: Thank you for everything! I am also fortunate to have worked alongside some amazing people who have encouraged me throughout the years. Vicki Kirk and Robbie Mitchell especially, but also my teammates from TDOE. To the rest of my friends, both near and far, thank you for your kind words of encouragement and support. In my life I have been very fortunate to have had a strong work ethic, a high sense of self-efficacy, and a lot of good fortune.

I did not get where I am without the help of a lot of people and without a lot of luck. I can honestly say that many of the doors that opened for me were because I was in the right place at the right time and I spoke up!

Lastly, I dedicate this work to all the students I have had the honor of teaching over the years. You have inspired me. You have made me curious. You have made me an advocate for education in Tennessee. I pledge that I will always work hard to ensure that students in Tennessee have a quality education.

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CHAPTER 1

INTRODUCTION

The Tennessee version of Every Student Succeeds Act (ESSA) is Tennessee Succeeds. This plan includes a section on Early Postsecondary Opportunities. Early Postsecondary Opportunities are part of the Ready Graduate Indicator and part of district and school accountability. The Ready Graduate Indicator includes graduation rate, ACT score, Early Postsecondary Opportunities, industry certifications, and the Armed Forces Vocational Aptitude Battery. The Tennessee Department of Education defines Early Postsecondary Opportunities (EPSOs) as a course or exam that gives students a chance to obtain postsecondary credit while still in high school. There are eight postsecondary opportunities in Tennessee; Advanced Placement, Cambridge International, College Level Examination Program, dual enrollment, International Baccalaureate, local dual credit, statewide dual credit, and student industry certification. The Tennessee Department of Education states that EPSOs allow students to become familiar with postsecondary rigor and expectations, develop confidence and skills for success in postsecondary learning, make informed college and career decisions, and decrease the time and cost of postsecondary certificate or degree attainment (TDOE, 2017d).

The Coleman Report, “Equity of Educational Opportunity” was published in 1966. This report influenced educational policy and public opinion. One of the main effects of this report was the shift from inputs to outputs or outcomes when defining a good school. These outputs include the amount that students know and their growth in knowledge, what they pursue after graduation and their employment and earning history (Hanushek, 2016). The Coleman Report continues to influence education policy as evidenced in the Tennessee Ready Graduate Indicator

as an accountability measure. The focus on outcomes-based measures for education quality has had a lasting impact. In addition, schools are now educating children from poverty at a rate that has not been seen in decades and some researchers argue that poverty explains why academic performance disparities exist (Ullucci & Howard, 2015).

With the inclusion of EPSOs in district and school accountability, high schools across the state have been increasing their EPSO portfolio and increasing student participation in EPSOs. While there has been a rush to do both of these, students may not be placed in EPSOs that are most relevant to their post high school plans, nor their aptitude. Additionally, there is some evidence that a student's socio-economic status may have an effect on ESPO performance. Finally, there is some evidence that ESPO performance may have an effect on 2-year completion rates. This study examined the student achievement data of economically disadvantaged students in Advanced Placement and dual enrollment courses and compared that data with 2-year completion data to see if there is a difference on 2-year completion rates based on course participation within the state of Tennessee.

Statement of the Problem

Since 2015 there has been an emphasis on promoting Advanced Placement and dual enrollment in Tennessee public schools based on the accountability requirements. In addition, there has been an increased emphasis on college enrollment and completion due to Tennessee Promise and the Drive to 55 Initiative. Finally, access and success gaps persist for economically disadvantaged students in Tennessee. Thus, this study served to measure the possible relationship between Advanced Placement and dual enrollment courses for economically disadvantaged students on 2-year completion rates at public Tennessee higher education institutions.

Research Questions

The following research questions were used to guide this study:

- RQ1: Is there a significant difference in 2-year completion rates between economically disadvantaged students and noneconomically disadvantaged students?
- RQ2: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who participated in an AP mathematics class (AP statistics, AP calculus AB, or AP calculus BC) and economically disadvantaged students who did not participate in an AP mathematics class?
- RQ3: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who received AP credit in a mathematics class (AP statistics, AP calculus AB, or AP calculus BC) and economically disadvantaged students who did not receive AP credit in a mathematics class?
- RQ4: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who participated in an AP English class (AP English Language and Composition or AP English Literature and Composition) and economically disadvantaged students who did not participate in an AP English class?
- RQ5: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who received AP credit in English class (AP English Language and Composition or AP English Literature and Composition) and economically disadvantaged students who did not receive AP credit in an English class?
- RQ6: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who participated in any dual enrollment credit course and noneconomically disadvantaged students who participated in a dual enrollment course?

- RQ7: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who took a dual enrollment course and received credit and economically disadvantaged students who took a dual enrollment course and did not receive credit?
- RQ8: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who participated in any dual enrollment course and economically disadvantaged students who participated in an AP course in English or mathematics?
- RQ9: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who received dual enrollment credit and economically disadvantaged students who received AP credit in English or mathematics?

Significance of the Study

Advanced Placement courses and dual enrollment courses could be keys to creating a stronger alignment between high school curriculum and post-secondary institutions (ACT, 2008). There have been multiple studies comparing the college outcomes of Advanced Placement and dual enrollment students (Speroni, 2011; Wyatt et al., 2015). Both Advanced Placement and dual enrollment are strongly associated with positive outcomes for students (Flores & Gomez, 2011; Patterson, Packman, & Kobrin, 2011; Struhl & Vargas, 2012; U.S. Department of Education, 2017; Venzia & Jaeger, 2013). Students who participated in dual enrollment courses are more likely than students who participated in advanced placement courses to go to college after high school, but they are less likely to enroll in a 4-year college (Speroni, 2011). Speroni also noted the impacts on degree attainment are not statistically significant between Advanced Placement and dual enrollment participation. In Tennessee economically disadvantaged students are half as

likely to enroll in Advanced Placement courses or dual enrollment courses as noneconomically disadvantaged students (TDOE, 2017d). Additional barriers for economically disadvantaged students include evidence that they are less likely to take exams to earn credits for Advanced Placement or dual enrollment courses and there are credit articulation discrepancies between community colleges and Tennessee Centers for Applied Technology (TCATs) with 4-year universities. (TDOE, 2017d). College completion and degree attainment begins before students enroll in college. Students must be academically and financially ready to enter college. In Tennessee, most students are not ready for college which decreases the number of college graduates. According to the Tennessee Higher Education Commission, fewer than 60% of the state's high school graduates enroll in college the fall after graduation from high school. The average graduation rate at Tennessee two- and 4-year public postsecondary institutions is much lower than the national average. Only 45% of Tennessee students graduate from postsecondary. Tennessee ranks 38th in the nation for public university graduation rate and 40th for community college graduation rates (Tennessee Department of Education, 2017b).

Limitations and Delimitations

Two-year completion rates for Tennessee community colleges and universities were examined for this study. It is possible that students enrolled in a non-Tennessee public higher education institution and did not drop out of school. Those data were not available to the researcher. The 2-year completion rate data was supplied solely by the Tennessee Department of Education. The department receives this data from P-20 and The Tennessee Higher Education Commission (THEC). The P-20 data is longitudinal data that follows students from Kindergarten through postsecondary. It is possible that there could have been data entry errors, such as student

name matching. For this study, the participants are the economically disadvantaged students who participated in the courses and for whom there is 2-year completion data. This study only includes students from Tennessee schools in which there are state data. The author used the Tennessee Department of Education method for identifying students who are economically disadvantaged.

This study was limited by the assumption that Advanced Placement and dual enrollment courses positively affect 2-year college completion rates. This study was also limited by the assumption that Advanced Placement and dual enrollment courses would have a positive impact on economically disadvantaged students. Factors other than participation in Advanced Placement and dual enrollment courses could have also had an impact on 2-year college completion rates. In addition, students may have participated in both Advanced Placement and dual enrollment courses and this may have an additional impact on the completion rate data.

The enrollment criteria for each course is also a factor. For example, a high school may enroll a student in dual enrollment course if they have a 19 ACT composite score but that is not the same requirement for Advanced Placement. Thus, the type of student who may be eligible to take these courses could be different and the author may have to account for these differences as well. Additionally, some high schools may only offer dual enrollment or Advanced Placement courses; thus, the student would not be able to self-select a course of study. This study was delimited in that some students entered post-secondary with Advanced Placement credits in subjects not used in this study.

Definitions of Terms

Key terms are defined to assist the reader in understanding terminology and concepts in the study. The following terms are defined by use in this study.

Advanced Placement (AP): Advanced Placement is a program of courses and exams managed by The College Board. There are approximately 37 different AP courses and exams, across 20 subject areas, offered across the United States. AP courses include math and computer science, English, sciences, history, world language, art, and the capstone program (The College Board, 2020). The AP courses allow high school students to take first year college courses while still in high school. At the end of the course, students may take an exam and the performance on the exam may imply that the student is eligible to receive college credit or influence the placement of the student in college coursework. (Handwerk et al., 2008).

College Readiness: College readiness is the level of preparation a student needs to enroll and succeed in a college program without requiring remediation (Venzia & Jaeger, 2013).

Dual Enrollment: Dual enrollment courses are collaborations between secondary and postsecondary institutions. Dual enrollment courses allow high school students to take college courses and earn college credits while still attending high school. As of 2011, there were more than two million students enrolled in dual enrollment courses (Marken et al., 2013) and almost all states offer dual enrollment course in high school (Cassidy et al., 2010). They are similar to AP courses in that they provide college preparation course work for students, but they differ because they often take place on a college campus and are often taught by college instructors. These courses support college credit accumulation and degree attainment by allowing high school students to experience college-level

courses to prepare for the social and academic requirements of college while having the additional supports from the high school (U.S. Department of Education, 2017).

Early College: Early colleges are comprehensive dual enrollment programs because they allow students to take enough dual enrollment courses to earn an associate's degree while still enrolled in high school with little to no cost to students (Berger et al., 2013).

Early Postsecondary Opportunity: The Tennessee Department of Education (2017d) defines Early Postsecondary Opportunities (EPSOs) as courses and/or exams that give students a chance to obtain postsecondary credit while still in high school. There are eight postsecondary opportunities in Tennessee: Advanced Placement, Cambridge International, College Level Examination Program, dual enrollment, International Baccalaureate, local dual credit, statewide dual credit, and student industry certification. The Tennessee Department of Education states that EPSOs allow students to become familiar with postsecondary rigor and expectations, develop confidence and skills for success in postsecondary learning, make informed college and career decisions, and decrease the time and cost of postsecondary certificate or degree attainment.

Economically Disadvantaged: The Tennessee Department of Education (2019a) uses the direct certification method for identifying students who are economically disadvantaged. The direct certification process was established through Congress to ensure that the most vulnerable children have access to free school meals and to make these programs more efficient (Levin & Neuberger, 2014). According to the state report card for the 2018-19 school year, 973,659 students were enrolled in Tennessee public schools. Of these students, 34.9% were economically disadvantaged.

Remedial Course: Remedial courses are courses at community colleges or colleges designed for students who are assessed as being underprepared for coursework and are required to take additional non-credit remedial courses. From 2011 to 2014 the percentage of students assigned to remedial courses in community college has declined by 9%, going from 77% in 2011 to 68% by 2014. In Tennessee universities, there has been a 10% decline in the same time period. (Wilson, 2016)

Workkeys: The ACT Workkeys are assessments used to measure foundation skills needed for success in the workplace. They measure the workplace skills that could indicate future job performance. There are assessments in applied math, graphic literacy, workplace documents, applied technology, business writing, workplace observation, fit, and talent (ACT, 2020).

Overview of the Study

Chapter 1 contains an introduction to the study, statement of the problem, research questions, significance of the study, limitations and delimitations, definitions of terms, and study overview. Chapter 2 contains a review of literature related to the study, the history of AP and dual enrollment programs, benefits of program participation, college readiness, and economically disadvantaged status. Chapter 3 contains the study methodology and includes research questions and null hypotheses, sampling information, and data collection and analysis methods. The results of the study are detailed in Chapter 4 which includes a presentation of the data for each research question and information about the findings of the study. Chapter 5 includes a conclusion and discussion of the results, implications for practice, and recommendations for future research.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Based on information from the Tennessee Department of Education, there are many barriers to economically disadvantaged student Early Post-Secondary Opportunity (EPSO) success. One of these is access to EPSOs. Rural counties are more likely to offer dual enrollment courses and urban/suburban areas are more likely to offer Advanced Placement courses. Enrollment is also a barrier. Economically disadvantaged students are half as likely to enroll in EPSOs as noneconomically disadvantaged students (TDOE, 2017d). Additional barriers include evidence that economically disadvantaged students are less likely to take exams to earn credits for EPSOs and credit articulation discrepancies between community colleges and Tennessee Centers for Applied Technology (TCATs) with 4-year universities. (TDOE, 2017d).

According to data from the Tennessee Department of Education, 41% of 2015 graduates attempted at least one EPSO. Twenty-six percent of these students took Advanced Placement courses and 19% of these students took dual enrollment courses (2017d). From this 2015 graduation data, there also appears to be an access gap. Fifty-six percent of noneconomically disadvantaged students took an EPSO versus 29% of economically disadvantaged students (2017d). Additionally, there are gaps within the EPSOs as well. For example, from the 2015 Tennessee graduation data, 38% of noneconomically disadvantaged students took Advanced Placement courses while only 17% of economically disadvantaged students took Advanced Placement courses. Likewise, 29% of noneconomically disadvantaged students took dual enrollment courses while only 12% of economically disadvantaged students took dual enrollment courses (2017d).

The 2015 graduation data from Tennessee indicates that students who take at least one EPSO are more likely to score higher on the ACT. Additionally, we also know that students who take at least one EPSO are more likely to enroll in postsecondary. This is true for noneconomically disadvantaged and economically disadvantaged students. Among economically disadvantaged students without an EPSO only 49% enroll in postsecondary compared to 66% of economically disadvantaged students with an EPSO (TDOE, 2017d). Economically disadvantaged students who take EPSO courses (66%) enroll in postsecondary institutions at similar rates to noneconomically disadvantaged students who do not take EPSO courses (64%).

College completion and degree attainment begins before students enroll in college. Students must be academically and financially ready to enter college. In Tennessee, most students are not ready for college which decreases the number of college graduates. According to the Tennessee Higher Education Commission, fewer than 60% of the state's high school graduates enroll in college the fall after graduation from high school. In addition, according to the Southern Regional Education Board, Tennessee students rely on grants and loans to a greater degree than the national average when attending Tennessee's public 2- or 4-year public colleges (Karp, 2013). The average graduation rate at Tennessee two- and 4-year public postsecondary institutions is much lower than the national average. Only 45% of Tennessee students graduate from postsecondary. Tennessee ranks 38th in the nation for public university graduation rate and 40th for community college graduation rates (Tennessee Department of Education, 2017b).

Beginning in 2015, several Tennessee state-wide initiatives aligned to bring the need for more prepared graduates into sharper focus. First, Tennessee's Governor Bill Haslam created the *Drive to 55 Initiative*. This initiative strives to get 55% of Tennesseans a college degree or

certificate by 2025. As of 2017, just 38.7% of Tennessean's hold postsecondary qualifications. This ranks Tennessee as 42nd in the country for postsecondary attainment (Tennessee Department of Education, 2017b). Governor Haslam saw this initiative as a mission for higher education and for the future workforce and economic development of Tennessee (Tennessee Board of Regents, 2015). If the goals of the *Drive to 55* initiative are met, over a half million Tennesseans would have a postsecondary degree and this could result in an additional \$9.33 billion in estimated annual income (Tennessee Department of Education, 2017b).

Second, Tennessee was the first state to promise free community college to all high school graduates in the Fall of 2015. This program is called Tennessee Promise and is part of the *Drive to 55 Initiative*. It has gained national attention. Funding for Tennessee Promise comes from the state lottery. Eligible students may receive up to five semesters of free tuition at a state community college. Students must enroll in community college the fall after graduating high school to be eligible and they must stay continuously enrolled at a full-time status (Grubb et al., 2017). In addition, the state offers a dual enrollment grant. Funding for this grant comes from the state lottery as well. The grant provides funding for dual enrollment tuition and fees for the student's first two dual enrollment courses at a community college (Tennessee Department of Education, 2017a).

Third, in 2017 the Tennessee Department of Education created a new accountability metric as part of Tennessee's Every Student Succeeds Act called the *Ready Graduate Indicator*. This measure also aligns with *Drive to 55*, which is an initiative in Tennessee focused on improving the economic success of the state through increased opportunities to earn postsecondary credentials (Tennessee Department of Education, 2018b). The *Ready Graduate Indicator* measures the number of students who earn a diploma from a Tennessee high school

and meet success measures that increase the probability of seamlessly enrolling in postsecondary education and securing high-quality employment (Tennessee Department of Education, 2018a). The success measures that are included in the *Ready Graduate Indicator* include earning a composite score of 21 or higher on the ACT or a 1060 or higher on the SAT, or completing four early postsecondary opportunities (EPSOs), or completing two EPSOs and earning an industry certification, or completing two EPSOs and earning a score of 31 on the Armed Services Vocational Aptitude Battery (ASVAB), or completing two EPSOs and earning a WorkKeys National Career Readiness Certificate. The evidence of student performance beyond academic proficiency is designed to represent a holistic, well-rounded education (Tennessee Department of Education, 2018a).

Fourth, in 2018 the Tennessee State Board of Education revised the high school policy. The high school policy establishes the requirements for graduation. It states that, “all students will have access to a rigorous education that will prepare them for success in postsecondary education and the workforce. All coursework should be aligned to the Tennessee Academic Standards for that subject and course” (Tennessee State Board of Education, 2018, p.1). Students must complete the ACT or SAT prior to graduation. In addition to the list of academic credits and subjects that are required for graduation, Tennessee has included an elective focus. Students must complete three credits in an elective focus and this focus must prepare them for the workforce or postsecondary study. These options include, CTE, science and math, humanities, fine arts, or Advanced Placement/International Baccalaureate. If students take CTE courses for an elective focus, these credits must be in the same CTE career cluster. Further, Tennessee high schools are required to accept postsecondary credits as substitutions for an aligned graduation requirement course. The state board policy also includes provisions for students who wish to

graduate more than a semester early in order to gain entry into a postsecondary institution.

Tennessee high schools are required to create a plan of study for each student. This is intended to connect a student's academic and career goals to a student's high school classes. Students must take a career interest inventory in middle school and again in high school. The survey results should be used to inform a plan of study. Another effort to help students explore career options is work-based learning. Work-based learning is not required for graduation, but schools are required to give students access to it.

The National Commission on Excellence in Education published *A Nation at Risk* in 1983. This report discussed the weakening of commerce, industry, science and technology in our nation and suggested that one way to combat this is to strengthen high school instruction. The U.S. Department of Education published a report *The Toolbox Revisited* (2006). This report strengthened the need for college readiness and a strong high school curriculum. This report also found that the intensity of the high school curriculum plays an important role in college completion. This chapter contains a review of the literature on the history of AP and dual enrollment programs, benefits of program participation, college readiness, and economically disadvantaged status.

Advanced Placement Program

The Advanced Placement Program grew out of early efforts following World War II to decrease the widening gap between high school and college. The Ford Foundation created the Fund for the Advanced Placement of Education in response to two studies they conducted in which educators recommended that high schools and colleges work together on course work coordination and high performing student advancement. The studies also recommended that

achievement exams should be given to students in order to assess their abilities and provide information for college entrance (The College Board, 2003).

The Committee on Admission with Advanced Standing conducted a study which proposed developing college-level curricula and standards that could be used in high schools. They then had college-level educators create course descriptions and assessments that could be used for college admission and credit. By 1952, this group had created a pilot program with advanced courses in 11 subjects. Three years later, the College Board took over the administration of these courses and assessments and named them the College Board Advanced Placement Program (The College Board, 2003).

As the work of the College Board continued to expand during the 1960s, they turned their efforts toward teacher training. Throughout the 1970s, 1980s and 1990s, more schools began offering AP courses and including minority and economically disadvantaged students in AP classes. In more recent years, the College Board has worked to help students in the middle grades to increase their knowledge and skills in preparation for AP courses in high school (The College Board, 2003).

Currently there are approximately 37 different AP courses and exams, across 20 subject areas, offered across the United States. Not every course is offered in every school. States and schools have continued to make efforts to increase participation in AP courses and exams. AP courses include math and computer science, English, sciences, history, world language, art, and the capstone program (The College Board, 2020).

The College Board's Advanced Placement program plays an important role in the rigor of high school course work. The Advanced Placement courses bring rigor into the high school curriculum by fostering critical thinking skills, which are often required in college courses

(Venzia & Jaeger, 2013). The AP program is the largest enriched high school experience to provide high school students with advanced curriculum. Approximately 94% of college students believe that taking challenging courses, such as AP, in high school would better prepare them for college courses (Cassidy et al., 2010). The AP courses allow high school students to take first year college courses while still in high school. The courses have a set of standards and end-of-course assessments that are created by college faculty and AP teachers. The College Board employs surveys, research, and professional development to ensure that the course content is aligned to entry-level college course expectations (Handwerk et al., 2008).

When students complete a course, they may take an exam and the performance on the exam may imply that the student is eligible to receive college credit or influence the placement of the student in college coursework. The exams are optional. Some states and local education agencies (LEA) have policies that require students to take exams, but this varies by state and LEA. A five-point scale is used to grade the exams. A score of five is the highest score and reflects a level of mastery of the course content. A score of three is reflective of a qualified score and can result in a student receiving course credit or advanced placement in courses from a higher education institution. The decision to award course credit or advanced placement, regardless of the AP exam score, is at the discretion of the institution and varies across institutions and AP subjects (Handwerk et al., 2008).

Advanced Placement exams are scored through a thorough process. Each exam is scored against a set of standards for the course. The College Board uses a comprehensive research program to ensure the validity of the scores, test construction, and test item bias which show that the AP tests are developed and interpreted with the highest professional standards (Warne, 2017).

AP Course Participation and Access

The College Board, state education agencies, and local education agencies have contributed to the expansion of AP course participation and access. In the 10th Annual Report to the Nation, The College Board reported that the expansion of AP programs, participation, and access was guided by the belief that more students are academically prepared and deserve access to AP programs. This is a departure from the previous mission of the AP programs to service primarily elite, wealthy, college-bound students. The College Board has sent a clear message that the rigors of AP courses should be available to all students, regardless of their location, background, or socioeconomic status (The College Board, 2014).

The number of AP course participants and exam takers has continued to increase over the last two decades. The College Board reports that the number of AP exam takers doubled from 2003 to 2013 and the number of low-income students quadrupled (The College Board, 2014). The 2019 data from the College Board indicates that 5,098,815 exams were taken by 2,825,710 students. This shows a 1% increase from 2018 (The College Board, 2020).

Advanced Placement course participation and exam completion have increased for several reasons. Hallet and Venegas (2011) cited three reasons for the increase. First, students who participate in the AP courses and pass the exams are viewed as the most academically advanced students in the nation. This is seen as a sign of equity and excellence. Second, since students who pass the AP exams with a qualifying score may be eligible for college credit, taking the courses and passing the exams is seen as a cost saving endeavor. The cost of the exam is substantially less than the tuition for the corresponding college course. Third, students who pass the exam with a qualifying score are viewed to have the skills and knowledge to be successful in the corresponding college level course (Hallett & Venegas, 2011). Thus, the reputation of the AP

program continues to grow as does the reputation that AP course participation is an indicator of college readiness.

In a 2008 report, Handwerk et al. examined AP course participation and exam completion across the United States and found that low-income students were less likely than other students to attend a public school offering AP courses and that less than 1% of low-income students took an AP exam. Handwerk also found that eligibility for advanced placement or college credit is also related to income status. Low income students had a median percentage of zero for receiving a score of three or higher on an AP exam. Thus, in a national study, low-income students are lagging behind their peers in AP access, participation, and exam results.

Hallet and Venegas (2011) cited several other research studies that indicate that disparity exists between students in upper and middle-income schools and low-income schools in access to AP courses. Students from low-income schools tend to be students of color and come from homes with non-college educated parents. Students from low-income schools are less likely to take AP courses or exams. When they do take the exams, they are less likely to pass the exams or attend postsecondary institutions.

There continues to be an ongoing debate about expanding, and possibly diluting, the AP program and maintaining the purity of the program. A group of students who are often overlooked when considering AP enrollment are the students in the middle who perform adequately in regular academic classes but who are not encouraged to participate in AP courses. An article by Flores and Gomez (2011) makes a case for increasing the number of students accessing AP courses. The article cites several barriers to AP program expansion. One barrier is the lack of *rigorous curricular infrastructure* in the middle grades, high schools, and between middle grades and high school. Another barrier is the master schedule in high schools. AP

courses require small class sizes and highly trained teachers. A third barrier is funding. Funding is needed to train teachers to teach AP courses, to reduce class sizes, and to provide testing. A fourth barrier is mindset. Many of the stakeholders involved in education believe that AP courses are only for the top performing academic students and this limits access for nontraditional students. A fifth barrier is lack of awareness by students and parents of the benefits of AP programs.

Gagnon and Mattingly (2015) assessed the trends in access to, enrollment in, and success in AP coursework in relation to school district poverty, racial composition, and urbanicity at the district level only from districts that offer some access to AP coursework. The brief found that nearly one-half of rural districts have no high school students enrolled in AP courses. Remote rural districts with small populations are nearly 10 times less likely to offer access to AP courses than are larger rural districts. In this brief, AP access is defined as a school district providing AP coursework to at least one high school student anywhere in the district. Further, the brief found that AP success rates are highest in suburban districts and that students in more affluent districts have higher success rates than those in less affluent districts, regardless of location. AP success is defined as the percentage of students enrolled in at least one AP course who take and pass, (with a score of 3 or higher) at least one AP exam.

Benefits of AP Program Participation

Numerous studies have followed students who took AP courses and/or exams into the college years. Patterson, Packman, and Kobrin (2011) cited evidence that students who perform well on the AP exam and place out of the introductory college course perform as well or better in the subsequent course as students who take the introductory course. Morgan and Klaric (2007)

compared the college academic records of 72,000 students over five years on course taking behavior and performance on subject areas in which AP exams were taken. Morgan and Klaric showed that AP students performed well in the course that followed the introductory course for which they received AP placement or credit. Hargrove, Godin, and Dodd (2008) found that AP students consistently outperformed non-AP students in total first-year GPA and earned higher GPAs in each of the AP subject areas. Patterson et al. (2011) examined the effects of AP exam participation and performance on college grades in nine subject areas as compared with non-AP examinees. They concluded that, consistently across the nine subject areas, there was support for the claim that as average AP exam score in each subject area increased, expected subject GPA increased. Shaw, Marini, and Mattern (2013) found that the AP composite score is a strong predictor of first year grade point average for college freshmen.

Chejaewski, Mattern, and Shaw (2011) examined the relationship between AP exam participation and enrollment in 4-year postsecondary institutions. They analyzed a national sample of 1.5 million students. Chejaewski et al. controlled for student demographics and ability characteristics and high school level predictors. They found that AP participation was related to college enrollment. They found that the odds of attending a 4-year postsecondary institution increased by at least 171% for all AP participation groups as compared to students who took no AP exams. AP participation was defined as taking one, two, three, or four AP exams.

Deaton (2014) examined the impact of the English AP program on college grade point average among rural Appalachian students. Deaton used the U.S. Census Bureau definition of rural and defined colleges serving students from the rural Appalachian Mountains regions as defined by the Appalachian Regional Commission. There was no significant effect on the first-semester GPA, nor did the students who took AP English outperform students without AP credit

in regard to first-semester GPA. Thus, in this study, the English AP scores did not correlate to the first-semester GPAs for rural Appalachian college students.

Warne (2017) summarized the state of knowledge about the academic benefits of AP. Warne cited prior research comparing AP students with non-AP students. These studies indicate that AP students score higher on standardized tests than non-AP students. These studies also show that AP students attend college at higher rates than non-AP students and that when they do attend college, they earn higher grades. Additionally, AP students are less likely to drop out of college and graduate from college at higher rates than non-AP students. AP students report more favorable attitudes toward the same academic material that corresponds to their AP coursework. Finally, AP students are more likely to major in a field related to their AP coursework than non-AP students are.

Student Perceptions of AP

Student perceptions about their experiences with Advanced Placement courses and exams play an important role in understanding the impact of AP. A 2013 study investigated how college students perceived their experiences in high school AP courses. The goal of the study was to add to the existing literature on outcomes of AP students in college and also investigate the possible benefits for students without success on at least one AP exam. Participants reported that their AP courses were high-quality and beneficial in terms of improving their skills needed for college success. “Students without AP exam success tended to report positive AP course experiences and a range of benefits attributed to their AP courses. Their responses were very similar to those of students with AP exam success (Cooney, McKillip, & Smith, 2013, p. 17). Thus, AP course

participation, even if exam performance is not high, positively contributes to skills needed in college.

Park, Caine, and Wimmer (2014) reviewed 20 relevant articles to investigate the experiences of student participation in AP and International Baccalaureate programs. Five common analytical themes were identified based on student-reported experiences. These themes included impact of peer relationships, impact of teacher-student relationships, construction of self-image, development of concepts of success, and impact of future planning.

Dual Enrollment

The dual enrollment courses also play an important role in the rigor of high school course work. Dual enrollment courses are collaborations between secondary and postsecondary institutions. Dual enrollment courses allow high school students to take college courses and earn college credits while still attending high school. These courses have gained in enrollment since they became common in the early 1990s. As of 2011 there were more than two million students enrolled in dual enrollment courses (Marken et al., 2013) and almost all states offer dual enrollment course in high school (Cassidy et al., 2010). Dual enrollment courses are similar to AP courses in that they provide college preparation course work for students, but they differ because they often take place on a college campus and are often taught by college instructors. These courses support college credit accumulation and degree attainment by allowing high school students to experience college-level courses to prepare for the social and academic requirements of college while having the additional supports from the high school. This may reduce the need for developmental or remedial college course work once students are enrolled in college. Dual enrollment students are more likely to attain a college degree. And finally, dual

enrollment courses help to reduce the overall costs of college and may increase the number of low socioeconomic students who can attend or complete college (U.S. Department of Education, 2017). Similar to dual enrollment courses are early colleges. Early colleges are comprehensive dual enrollment programs because they allow students to take enough dual enrollment courses to earn an associate's degree while still enrolled in high school with little to no cost to students (Berger et al., 2013).

In 2013, the National Center for Educational Statistics updated a previous study on the prevalence and characteristics of dual enrollment programs and courses for high school students at postsecondary institutions. This study used a survey to collect small amounts of data from a nationally representative sample of institutions. There was a 93% response rate to the survey. Of the institutions surveyed, 53% reported that high school students took courses for college credit within dual enrollment programs. Among these institutions, 83% of the courses were offered on the college campus and 64% were taught on the high school campus. Fifty-four percent of the institutions reported that most students take one course per academic term. Ninety-five percent of institutions with dual enrollment programs awarded college credit for courses after course completion. Only 4% awarded credit once the student enrolled in the institution after graduation. Forty-six percent of the institutions reported academic eligibility requirements to participate in the dual enrollment program were the same as admission standards for the regular college students (Marken, Gray, & Lewis, 2013). Some studies have found that local implementation of dual enrollment programs can be challenging and is influenced by state and local policy. There are several things that are critical for successful implementation of dual enrollment programs. These components may include high school-college partnerships, articulation, funding, and student access and support (Cassidy et al., 2010).

In a study by the U.S. Department of Education for What Works Clearinghouse, there were five studies that met the design standards for the study. From studies involving 77, 249 high school students from across the United States, there was medium to large evidence for student outcomes in degree attainment from college, college access and enrollment, credit accumulation, completing high school, and general academic achievement in high school for students who take dual enrollment courses (U.S. Department of Education, 2017).

Struhl and Vargas (2012) found that dual enrollment is a strategy for improving postsecondary success. The study focused on over 32,000 students from the 2004 graduating class in Texas. Half of the students in the study completed at least one dual enrollment course before graduation and the other half did not. The half who did take a dual enrollment course were “significantly more likely to attend college, persist in college, and complete an associate’s degree or higher within six years” (Struhl & Vargas, 2012). Several studies have looked at the impact on dual enrollment as a means to reduce the need for remediation in college. They suggest that taking dual enrollment courses help to improve college readiness. These studies found that students who took dual enrollment courses were less likely to enroll in remedial courses than traditional students (An & Taylor, 2015).

Socio-economic status plays a role in academic preparation and educational attainment. High socio-economic students are more likely to participate in dual enrollment than low socio-economic students (An, 2013). Since there are gaps in dual enrollment participation for low socio-economic students, and there is a known benefit for participation in dual enrollment, efforts are being made to ensure that dual enrollment reaches more low socio-economic students. An (2013) examined whether dual enrollment serves as a means to improve college degree attainment as well as whether these programs benefit students from low socio-economic

backgrounds. He found that dual enrollment positively impacts degree attainment for low socio-economic students.

Dual Enrollment Participation and Access

Dual enrollment programs came into common practice in the early 1990s. By 2011 there were more than two million students enrolled in dual enrollment programs. When dual enrollment first began it was designed for advanced students. This practice has changed and now more students have access to dual enrollment courses (U.S. Department of Education, 2017).

Shivji and Wilson (2019) looked at the high school and post-secondary trends of over 23,000 ninth graders in a national study. Of the students in the study, 34% took dual enrollment courses for post-secondary credit while in high school. The study also found that 42% of students whose parents had earned a Bachelor's degree or higher took dual enrollment courses compared to only 26% of students whose parents' highest level of education was lower than a high school diploma. Additionally, the study found that White and Asian students were more likely to enroll in dual enrollment compared to Hispanic or Black students.

The High School Longitudinal Study also examined where high school students took dual enrollment courses. The majority of students, 80%, took dual enrollment course at their own high school. Some students took dual enrollment courses on a college campus (17%) or at a high school other than their own (6%). Students who attend high schools located in cities were more likely to take dual enrollment courses on a college campus. Students who attend high schools located in rural locations were more likely to take dual enrollment courses online (Shivji & Wilson, 2019).

Nationally, about 15% of community college entrants were high school dual enrollment participants in 2010. In Tennessee, about 18% of community college entrants are high school dual enrollment participants (Fink et al., 2017). These numbers have most likely grown since 2010. High school dual enrollment students can take courses at two- and 4-year institutions. Most students take dual enrollment courses at community colleges and the growth of dual enrollment is concentrated in the community college sector (Fink et al., 2017).

According to a 2016 state analysis of dual enrollment program eligibility policies, there is variation in eligibility criteria. Program eligibility can be set by a state agency, local agency, or the postsecondary institution. This study found that state designed eligibility policies often limit dual enrollment access to most academically advanced students. Middle achieving students' access to dual enrollment may be limited or they may not be able to participate at all (Zinth, 2016a; Zinth, 2016b).

Some states are working to expand eligibility criteria to include middle achieving students. For example, two high schools in Utah have developed alternate dual enrollment eligibility criteria to see if dual enrollment might increase students' postsecondary enrollment. These middle achieving students do not participate in accelerated programs but did qualify academically or missed qualifying by a small margin and received recommendations from counselors and teachers. These alternate eligibility criteria were used to identify and recruit students into a dual enrollment personal finance course. When looking at final course grades for these students, there was not a significant difference between high achieving and middle achieving students (Zinth, 2018).

Another example from California showed evidence that middle and lower achieving students can be successful in dual enrollment programs as well. Struggling students in career and

technical education courses on renewable energy earned better grades in dual enrollment courses than they did in high school classes. In another example from California involving a film making course, struggling students did not do well at test taking but excelled in the hands-on project of making films (Zinth, 2018).

While college participation has substantially increased over the last 80 years, only about 57% of students earn a degree within six years of entering college (An, 2013). Dual enrollment courses help students attain college credit which helps students build a momentum toward college completion. There is research that maintains that students who participate in dual enrollment courses are more likely to attain an associate's degree by 61% and about 20% more likely to attain a bachelor's degree (An, 2013).

Shaw (2019) interviewed high school counselors from a sample of Tennessee high schools. The counselors identified areas for improvement in dual enrollment programs in their Tennessee high schools. The areas for improvement included strengthening communication lines between key stakeholders, increasing support personnel to strengthen the likelihood of success of dual enrollment students, and increasing the opportunity for career, technical, and vocational enrollment.

Dual Enrollment and Socio-Economic Status

Dual enrollment programs are designed to encourage college access and degree attainment for students who are typically underrepresented in college. These programs assist students by often offering discounted or free tuition. This helps to reduce the cost of college and may increase the number of low socio-economic students to enroll in and complete college. (U.S. Department of Education, 2017). The Early College High School Initiative, funded by the

Bill and Melinda Gates Foundation, is an example of a comprehensive dual enrollment program that is aimed at helping underserved students earn a postsecondary credential while in high school in order to motivate them and increase their access to postsecondary education after high school (Berger et al., 2013).

Dual enrollment participation has increased substantially in the last two decades. Many families may view dual enrollment as a way to save money by finishing college faster. Fink, Jenkins, and Yanagiura (2017) found that taking dual enrollment courses may increase the chances that disadvantaged students go to college and earn a degree. They looked at community college outcomes by state. Nationally about two thirds of dual enrollment students were from middle- or low-income households. In many states there were disparities in degree completion rates between high-income and low-income students. When looking at completion rates there was a gap of 10 percentage points or more between higher and lower income students (Community College Research Center, 2017).

When looking at college completion rates the disparity trend continues between high-income and low-income students. An (2013) found that low-income students are approximately half as likely to attain a degree as high-income students. An also found that dual enrollment has a positive impact on college degree attainment and found that dual enrollment did not hinder degree attainment for low-income students. First generation college students from low-income families were also more likely to attain a college degree than students who did not take dual enrollment courses. Taylor (2015) analyzed the effects of dual enrollment on college enrollment and completion among lower income students and students of color. This study found that there is a small but positive impact on college enrollment and completion for low-income students and students of color.

Benefits of Dual Enrollment

Multiple studies conducted over the last 10 years found positive benefits for students who participated in dual enrollment. These studies have found that dual enrollment increases post-secondary enrollment and success. These are from both single state studies and national studies (Allen & Dadgar, 2012). Dual enrollment is an aid for improving college readiness, has a positive effect on college grade point average, and college graduation rate (Ganzert, 2014). In general, dual enrollment students have higher college completion rates than other students (Shapiro et al., 2013). On average, dual enrollment participants that enroll at a public 4-year college complete a bachelor's degree one year sooner than non-dual enrollment participants. Associate degree earners who participated in dual enrollment earn their degree nearly two years earlier than non-dual enrollment participants (Shapiro et al., 2016).

The College Now program is the largest dual enrollment program in an urban public school setting and is facilitated on the 17 campuses of The City University of New York (Allen & Dadgar, 2012). The College Now program has three goals: to improve graduation rates, increase the level of college preparation, and enable greater success in college. Allen and Dadgar found large and positive effects of the program in helping students earn college credits while in high school, in earning more college credits while in high school, and in earning higher grades once enrolled in college. They also found that the College Now program may help reduce the time it takes for students to earn a college degree.

A large, multi-year study was conducted in Iowa comparing the performance of dual enrollment students and traditional students. These students attended Iowa high schools and community colleges. The study examined college course grades both during and after high school for these students. The study found that dual enrollment students consistently performed

better than traditional community college students in community college courses. However, dual enrollment students performed about the same as traditional community college students after they completed high school (Crouse & Allen, 2014).

Using data from the Wabash National Study of Liberal Arts Education, a study was conducted that looked at the relationship between dual enrollment participation and college readiness at the end of the first year of college. College readiness was defined as cognitive factors, such as academic achievement and coursework. College readiness was also defined as noncognitive factors, such as commitment to academic goals and effort. The study was focused on whether dual enrollees continued to display higher levels of college readiness than traditional students. Conclusions from the study indicate that students who participated in dual enrollment courses display higher levels of college readiness at the end of their first year of college. The significance is greater on cognitive factors than on noncognitive factors (An & Taylor, 2015).

Grubb et al. (2017) examined the impact of dual enrollment on community college completion. They looked at both two- and 3-year completion rates and remediation courses. The population of the study included 1,232 students who were enrolled in a community college as first time, full-time students who entered community college the fall after finishing high school. The results determined that dual enrollment resulted in a reduction of remedial courses as compared to nonparticipants. Only 4% of dual enrollment participants needed remedial courses in community college compared to 11% of nonparticipants. The impact on completion rates was even more significant. Dual enrollment participants completed community college in 2 years at rates twice as high as nonparticipants. Over 45% of dual enrollment participants finished college in three years compared to 36% of nonparticipants. The results from this study indicate that dual enrollment has a positive effect on completion rates at two and three years, as well as reducing

the need for remedial courses in a community college. A national study found that 46% of former dual enrollment students who started community college immediately after high school earned a college credential (either a certificate, associate degree, or bachelor's degree) within five years (Fink et al., 2017).

Advanced Placement and Dual Enrollment Comparisons

More groups are advocating for more alignment between high school curriculum and post-secondary institutions. The National Governors Association and the Commission on the Future of Higher Education have both released statements in support of better alignment. The reauthorization of the federal Higher Education Act has also brought new interest in aligning the work of high schools and post-secondary institutions. Increased alignment could possibly increase the likelihood of student enrollment and success in higher education. Advanced Placement courses and dual enrollment courses could be keys to creating a stronger alignment (ACT, 2008). There have been multiple studies that have compared the college outcomes of Advanced Placement and dual enrollment students. One such study was conducted by the National Center for Postsecondary Research in November of 2011. This study used data from two cohorts of all high school students in Florida. The study examined the relative influence of Advanced Placement and dual enrollment participation in predicting college access and success. The study found that both Advanced Placement and dual enrollment are “strongly associated with positive outcomes, but the enrollment outcomes are not the same for both programs” (Speroni, 2011, p.iii). Students who participated in dual enrollment courses are more likely than students who participated in advanced placement courses to go to college after high school, but they are less likely to enroll in a 4-year college. Speroni (2011) found that the impacts on degree

attainment is not statistically significant between Advanced Placement and dual enrollment participation.

Wyatt et al. (2015) compared the outcomes of students who participated in either Advanced Placement or dual enrollment courses and who graduated from high school in 2006. They looked at 4-year college enrollment, persistence at a 4-year institution, graduation in four years and six years, and first year college grades. They found that Advanced Placement students who had taken at least one AP exam and scored a three or higher had better college outcomes than dual enrollment students who enrolled in either a two- or 4-year institution. Advanced Placement students who scored below a three on an AP exam performed as well as or better than dual enrollment students who attended a 2-year institution on college outcomes.

Bowers (2016) conducted a small study at one Tennessee university. This study looked at the effects AP and dual enrollment courses have on college readiness and the effect that these courses have on fall-to-fall retention rates at the university. Bowers found that AP English, AP math, and dual enrollment credits increase first year fall-to-fall college retention at this Tennessee university. Another study at the same Tennessee university looked at student perceptions of Advanced Placement and dual enrollment after entering college. Students felt that both Advanced Placement and dual enrollment were beneficial to their academic success in college. These students also perceived the college readiness skills gained from Advanced Placement and dual enrollment were beneficial to their academic success in college. These students rated dual enrollment higher than Advanced Placement when considering which type of course most influenced their college readiness skills (Norris-Shu, 2018).

College and Career Readiness

College readiness has many definitions and can be assessed in several ways. College readiness is the level of preparation a student needs to enroll and succeed in a college program without requiring remediation (Venzia & Jaeger, 2013). The National Forum on Educational Statistics defines college and career readiness as when a student has attained the knowledge, skills, and disposition needed to succeed in credit-bearing (non-remedial) postsecondary coursework or workforce training program in order to earn the credentials necessary to qualify for a meaningful career aligned to his or her goals and offering a competitive salary (National Forum on Educational Statistics, 2015). The Tennessee Department of Education defines college and career readiness as the knowledge and skills needed for entry-level work and college freshmen coursework and success whether pursuing a career or a college education. In addition, this includes earning a composite ACT score of 21 or higher, participating in early postsecondary opportunities (EPSOs), and/or meeting the criteria for career readiness, military readiness, or industry certification (Tennessee Department of Education, 2017c). According to the Tennessee State Report Card, 40.3% of 2018 Tennessee graduates were ready to graduate. This represents a 4.5% increase from 2017. Only 20.5% of economically disadvantaged students were ready to graduate in 2018 (Tennessee Department of Education, 2019).

There is no standard, national measure for college and career readiness. One way to assess the college readiness of American students is through the National Assessment of Educational Progress (NAEP). NAEP is a large, nationally representative assessment that has been in continuous use for many decades. NAEP results suggest that American students may not be college ready. The 2009 results indicate that about 39% of 12th grade students are proficient in reading and about 26% are proficient in math (Venzia & Jaeger, 2013).

The American College Test (ACT) and the Scholastic Aptitude Test (SAT) are also used to determine college readiness. In 2012, only 25% of all high school seniors met all four of the college readiness benchmarks on the ACT. In the same year, 43% of high school seniors met the SAT college and career readiness benchmark (Venzia & Jaeger, 2013). Another possible measure for college and career readiness is the Armed Services Vocational Aptitude Battery (ASVAB). This assessment is given to high school students who are seeking entry into the military. A study from 2010 found that about 20% of students who took the ASVAB did not pass the academic portion of the test (National Forum on Educational Statistics, 2015).

Tennessee primarily uses the ACT as a measure of college and career readiness. In 2017, almost 76,000 students took the ACT. The average composite score was 19.8, compared to the national average of 21 (ACT, 2017b). For the 2018 graduation class, Tennessee's ACT composite grew to 20.2 (Tennessee Department of Education, 2019). The ACT is a graduation requirement in Tennessee. Most Tennessee public higher education institutions require the ACT and use those scores to assess students' academic readiness for postsecondary education. In 2017, 19% of Tennessee graduates met all four ACT College Readiness Benchmarks (ACT, 2017b). Students who meet the ACT College Readiness benchmarks in all four subject areas are more likely to re-roll at the same post-secondary institution their second year, have higher grade point averages, and complete college degrees. These facts remain true for students across family income groups (ACT, 2008).

The philosophical basis for the ACT is the belief that students should be assessed by directly measuring the academic skills needed to perform well in college-level work. Thus the ACT assessment aims to reproduce the complexity of college-level work through the assessment items. In this manner, the ACT score is designed to be a direct measure of the students'

education progress in the major curriculum areas that are assessed. ACT conducts multiple measures of validity, with multiple years of longitudinal statistical evidence, that support the relationship between ACT performance and performance in beginning college-level corresponding courses (ACT, 2019).

According to the ACT Technical Manual, the reliability estimates for each subtest of the ACT are fairly high. The values are over 0.9 for English, mathematics, composite, STEM, and ELA scores. The values are over 0.8 for reading and science. Reliability coefficients help to quantify the level of consistency of test scores. Reliability coefficients range from zero to one. Values closer to one indicate a higher consistency (ACT, 2019).

The 2016 Fairness Report for the ACT Tests describes the procedures ACT uses when creating and preparing the ACT test forms. ACT aims to make the tests as fair as possible to all test-takers. Fairness begins with test design and specifications and continues through item writing and review, item pretesting, item selection and forms construction, and forms review (ACT, 2016).

Also, in 2017, 19% of Tennessee graduates were likely to attain the Gold ACT Workkeys National Career Readiness Certificate compared to 27% nationally. A Gold certificate indicates that skills needed for 93% of jobs from the ACT JobPro database (ACT, 2017b). The ACT Workkeys are assessments used to measure foundation skills needed for success in the workplace. They measure the workplace skills that could indicate future job performance. There are assessments in applied math, graphic literacy, workplace documents, applied technology, business writing, workplace observation, fit, and talent (ACT, 2020). Three of the Workkeys assessments form the foundation of the National Career Readiness Certificate (NCRC). These assessments are workplace documents, applied math, and graphic literacy. The NCRC is issued

at four levels: bronze, silver, gold, and platinum. The level is determined by score on the three assessments. These three assessments are used because these skills are critical to employment success (ACT, 2017a).

The Offices of Research and Educational Accountability (OREA) analyzed available ACT scores in 2014. They found that 75% of Tennessee Board of Regents (TBR) community college freshmen, and 48% of Tennessee public university freshmen did not meet the TBR criteria for college readiness in math, reading, and/or writing (Wilson, 2016). In TBR community colleges, students who are assessed as being underprepared for coursework are required to take additional non-credit remedial courses. Tennessee public universities cannot offer non-credit remediation courses. As per the Complete College Tennessee Act of 2010, they must offer supplemental learning support as part of college-level courses. Tennessee is making efforts to reduce the need for postsecondary remediation. From 2011 to 2014 the national percentage of students assigned to remedial courses in community college has declined by 9%, going from 77% in 2011 to 68% by 2014. In Tennessee universities, there has been a 10% decline in the same time period (Wilson, 2016).

Based on the graduating class of 2017, Tennessee is strengthening its pipeline of students who are prepared for college and/or careers (ACT, 2017). Approximately 7% of the graduating class aspired to attain an associate's degree. These students had an average composite score of 16.6. Approximately 18% of the graduating class aspired to attain a professional degree. These students had an average composite score of 22.8. Approximately 41% of the graduating class aspired to attain a bachelor's degree. These students had an average composite score of 19.9. Approximately 10% of the graduating class aspired to attain a graduate degree. These students had an average composite score of 23.7.

In order to better prepare students for college and careers federal, state, and local education agencies have instituted a number of initiatives and opportunities. Two such initiatives are Advanced Placement courses and dual enrollment courses, including Middle College and Early College High Schools. Additional interventions designed to boost college readiness include federal TRIO programs such as Upward Bound, Talent Search, and GEAR UP. According to ACT, students who take higher-level science, social studies, and mathematics courses are 7-25% more likely to enroll in college than students who do not take higher-level courses. Students who take higher-level English and math courses in high school are also less likely to need remediation in college. This is true for all family income groups as well (ACT, 2008).

In 2015 ACT released a holistic framework (Camara et al., 2015) to describe education and work readiness. The framework has four domains based on a review of theory, research, experts in the field, and education and work standards. The first domain is core academic skills. These include the domain-specific knowledge and skills necessary to perform essential tasks in English language arts, mathematics, and science. The second domain is cross-cutting capabilities. These include the general knowledge and skills needed to perform tasks across content areas. Examples of these include technology and information literacy, collaborative problem solving, studying and learning, and thinking and metacognition. The third domain is behavioral skills. These include needed interpersonal skills and self-regulatory skills need for adaptation to succeed in educational and workforce environments. The fourth domain is education and career navigation skills. These are the skills needed to make informed and relevant decisions and develop actionable, achievable plans. These four broad domains are interrelated and influence education and work readiness and success. In addition, ACT created a definition of a work ready individual. A work ready individual has the foundational skills needed to be

minimally qualified for an occupation based on the occupation profile. The skills needed for work readiness include both foundational and occupational specific skills, skills that are varied in both importance and level based on the occupation, and skills that are dependent on the critical tasks identified through a job analysis or profile (ACT, 2013).

The need for a college and career ready workforce is growing. The Center on Education and the Workforce at Georgetown University projected that the United States economy would create about 47 million job openings by 2018 and that two-thirds of these jobs will require at least some post-secondary education, including an associate's degree or occupational certificate (Symonds et al., 2011). By 2020, it is expected that 65% of all jobs in the United States economy will require postsecondary education and training beyond high school (Carnevale et al., 2013). There is a need for United States public schools to prepare students for the workforce as well as college so that students have the skills and abilities needed in the workforce.

Another study by Georgetown University looked at job growth and educational requirements through 2020. This study found that job growth will be fastest in healthcare, community services, and STEM fields for occupational clusters. Job openings by educational attainment is split almost equally among the need for bachelor's degree, some college or associate's degree, or no education beyond high school. By 2020, the United States is projected to fall short by five million workers who need to have postsecondary education (Carnevale et al., 2013).

Economically Disadvantaged Status

Defining Economically Disadvantaged Status

William Beveridge issued a report in 1942 in which he identified five evils that needed to be defeated. These evils were squalor, ignorance, want, idleness, and disease. He began to look at poverty as more than just lack of income or “want.” He knew that poverty, or disadvantage, was multidimensional (Reeves et al., 2016). One in five children under the age of 18, or 16 million children, live in poverty (U.S. Census Bureau, 2019).

The Center for Poverty Research at the University of California, Davis (2014) stated that there are two federal poverty measures in the United States as measured by the U.S. Census Bureau. They are the official poverty measure and the supplemental poverty measure. Both of these measures are based on estimates of the level of income needed to cover basic needs. Those who live in households with earnings below this level, are considered to be in poverty. In 2011, 15.1% of Americans lived in poverty as based on the official poverty measure and 16% of Americans lived in poverty based on the supplemental measure. Deep poverty is defined as having an income below 50% of the poverty threshold. “In 2016, 18.5 million Americans lived in deep poverty. This was about 5.8% of the total population and about 45.6% of those in poverty” (Center for Research on Poverty, 2014, p.2). The Federal Poverty Line (FPL) is low. In 2015 it was \$24,250 for a family of four. This line was established in the 1960s. At that time FPL was about 50% of median income. Today, the FPL is closer to 30% of the median income (Reeves et al., 2016). The United States has the largest income gap, as compared to other industrialized countries, between its wealthy and poor citizens (Beliner, 2014).

The Tennessee Department of Education uses the direct certification method for identifying students who are economically disadvantaged. The direct certification process was

established through Congress to ensure that the most vulnerable children have access to free school meals and to make these programs more efficient (Levin & Neuberger, 2014). Direct certification is the process under which Local Education Agencies (LEAs) certify children who are members of households receiving assistance from specific programs. These programs include the Supplementation Nutrition Assistance Program (SNAP), Food Distribution Program on Indian Reservations (FDPIR), Temporary Assistance for Needy Families (TANIF). In addition any student who is homeless, a runaway, a migrant, a foster child, or enrolled in Head Start or Even Start is eligible for free benefits, without further application, based on information provided by the state or local agencies administering the programs (Tennessee Department of Education, 2019b). Local Education Agencies are required to conduct direct certification three times per year to provide proof of eligibility. Thus, it is up to the LEA to report the number of students who are economically disadvantaged and match them to a student identification number. Tennessee also uses the Community Eligibility Provision (CEP) which is an option for high-poverty schools to offer free breakfast and lunch to all students and gets information from the direct certification process. According to the state report card for the 2018-19 school year there were 973,659 students enrolled in Tennessee public schools. Of these students, 34.9% were economically disadvantaged (Tennessee Department of Education, 2019a).

The direct certification process of identifying students has come under some criticism. Improvements to the direct certification process have been made over the last ten years. Proponents of the direct certification method feel that it increases student access to school breakfast and lunch and that it decreases the burden on families and schools by limiting the paperwork that must be processed. In addition, proponents feel that it helps to alleviate child hunger and improve child well-being because it is directly related to the Supplemental Nutrition

Assistance Program (SNAP) and that improving the direct certification process will help more low-income children receive school meals (Levin & Neuberger, 2014).

Direct certification began in 1986. Congress has taken steps to improve the program. In 2004 Congress required all school districts to use direct certification for students in households receiving SNAP benefits. Congress has provided funding to help with direct certification. In 2010 Congress reauthorized the Healthy, Hunger-Free Kids Act. This act set performance benchmarks for states. All states must directly certify at least 95% of children who receive SNAP benefits by 2014 (Levin & Neuberger, 2014).

One study looked at the matching process of the direct certification process to see if it could be improved to increase the number of students who are directly certified. The study found inconsistencies in the direct certification method. Age, commonality of first and last name, type of school enrollment, location of school, and local economics and urbanicity all created variance in the percentage of students who were directly certified (Moore et al., 2014). According to this study 28 states fall short of the 95% benchmark for direct certification with SNAP. There were twelve states that fell significantly below the benchmark which means that more than one in five eligible students are not directly certified. Tennessee did meet the 95% or above benchmark in 2013 (Levin & Neuberger, 2014). In a 2016 report to Congress on the improvements to the direct certification progress and an increase was noted. In this report there were 13.8 million students directly certified. This was an increase of 3.8% from previous years. The 2016 report found that 91% of children in SNAP households were directly certified for free school lunch and breakfast. There were twenty-four states that achieved the 95% mandated performance target. Again, Tennessee was one of these states. In addition, no states had a performance rate lower than 60%. (Moore et al., 2016). These studies show that there is an implication that many students are not

being identified as economically disadvantaged by state education agencies. Under identification leads to a reduction in funding for schools with low-income students.

Free and reduced-price meal (FRM) eligibility has been used as a proxy for economically disadvantaged status in education research for decades. Federal, state, and local agencies have also relied on free and reduced-price meal eligibility data to monitor and regulate educational outcomes. These agencies have also used FRM to allocate funding, including the U.S. Department of Education's Title I program. The free and reduced-price meal eligibility has been an effective indicator of economically disadvantaged status, even though it may be an imperfect measure (Koedel & Parsons, 2019).

Poverty, or economically disadvantaged, can be calculated and defined in many different ways. Poverty is about having a lack of money. But poverty is also about many other things including poor health, insecurity, discomfort, isolation, and lack of agency (Reeves et al., 2016). Reeves et al. examined multiple dimensions of poverty. Specifically, they examined low household income, limited education, lack of health insurance, concentrated spatial poverty, and unemployment. They looked at these dimensions with particular attention to race. Using data from the American Community Survey for 2014 they looked at the prime working population, or adults 25-61 in age. From this data almost half of the population is in at least one of the five dimensions of poverty. Almost 25% have two or more dimension and almost 10% have three or more. In addition, they found that multidimensional poverty is more common among Black and Hispanics.

Impacts on Education

Many studies have repeatedly shown that socioeconomic status (SES) is one of the strongest predictors of academic outcomes (Lubienski & Crane, 2010; Ladd, 2012; Reardon, 2013). Some researchers argue that multiple measures should be used when looking at the impact of poverty on school achievement. These measures could include free and reduced-price meal (FRM), direct certification, and Community Eligibility Provision (CEP). Additional measures could include the number of children in the household, mother's age at first birth, the number of children's books in the home, parent educational level, income, and occupation (Lubienski & Crane, 2010).

A comprehensive study by Reardon (2013) looked at the relationship between academic achievement and family income in the United States for the last 50 years. There were three striking findings from this study. First, the income achievement gap has grown significantly in the last three decades. The gap in reading achievement has grown by 40% between 1940 and 2000. Economic inequality is now greater than racial inequality for educational outcomes. Second, income gaps have continued to grow in other measures of education success. The college completion rate for low-income students has barely moved in the last few decades but it has grown for high-income families. Third, the income gap remains about the same for students from the start of kindergarten through 8th grade. This shows that schools may actually reduce the academic inequality gap. Reardon suggested three strategies that schools can use to continue to reduce the academic inequality gap. He suggested that states and schools should allocate more resources to the early grades so that by intervening early there is a greater chance of eliminating gaps. He also suggests that schools should extend the school day and offer more school resources, such as after-school and summer school programs, to narrow the achievement gaps.

Finally, he suggested states and schools should ensure that all students have access to high-quality teachers, stimulating curriculum and instruction, and adequate school resources.

There is a strong correlation between student achievement and income in international data from developed countries as well (Ladd, 2012). In order to compare data across developed countries the Organization for Economic Co-Operation and Development created a measure for economic, social, and cultural status. This measure is called ESCS. When looking at the Programme for International Student Assessment (PISA) data there is a strong positive correlation between family ESCS and student performance. Thus, achievement levels of the low ESCS children fall far short of their peers. Low ESCS students from the United States perform worse than their counterparts in other countries. Thus, the largest shortfalls in performance among U.S. students are concentrated among those with low ESCS.

In a 10-year study on the impacts of poverty on early literacy, a group of researchers found that the amount and quality of print that low-income children is exposed to is far below that of other children. The study indicated that there is about one book for about every 20 children in a community of poverty. Whereas there are about 13 books for every child in a community of privilege (Neuman, 2013). This trend continued into differences in independent reading as well. Students from low-income communities read books on a lower level than students from other communities. In addition, students from low-income communities also spent less time reading independently than students from other communities (Neuman, 2013). Over the years, this can lead to a knowledge gap for low-income students. Poverty also impacts classroom engagement. Students from economically disadvantaged homes can struggle with classroom engagement (Jensen, 2013). A recent study found that students from low-income

backgrounds spend half as much time on grade-level assignments and one-fifth the time with strong instruction (The New Teacher Project, 2018).

Students who come from poverty bring with them a *risk load* when they come to school. (Sparks, 2014). This risk load can be a predictor of chronic absenteeism and academic achievement. This risk load includes 18 factors from impoverished communities including free lunch eligibility, temporary or public housing, welfare benefits, special education services, school suspensions, low safety and/or engagement scores for schools, poverty rate, adult education levels, and parent employment or unemployment. In his New York study, Sparks looked at the relationship of school risk loads and student achievement. By including the risk load factors instead of just poverty rates, it creates a more dynamic understanding of the school's context. The risk factors a school has can also indicate the unique support and interventions that might be needed to help the school and students. Some researchers argue that in order to change academic inequality we must address economic and social policies. They argue that the sources of the academic inequality are outside of school and are the result of income inequality (Berliner, 2013).

During the 2010-11 school year, there were more than 49 million students enrolled in public schools. White and Asian students are more likely to attend low-poverty schools and American Indian/Alaskan native, Black, and Hispanic students are more likely to attend high-poverty schools. High-poverty schools graduate almost 23% fewer students than high-poverty schools and students from high-poverty schools are 24% less likely to enroll in a 4-year postsecondary institution (Venzia & Jaeger, 2013). Only about 9% of low-income students will obtain a college degree (Berliner, 2014). Almost 60% of high school graduates are enrolling in

college. About 40% of these students will need remedial courses and these students are 74% more likely to drop out (The New Teacher Project, 2018).

CHAPTER 3

METHODOLOGY

The purpose of this study was to measure the possible relationship between Advanced Placement and dual enrollment courses for economically disadvantaged students on 2-year completion rates at public Tennessee higher education institutions. A quantitative, quasi experimental, comparative design was used to analyze secondary data to determine if there is a relationship between Advanced Placement and dual enrollment courses and 2-year completion rates for students in Tennessee community colleges and public universities.

Research Questions and Null Hypotheses

The following research questions were addressed through testing corresponding null hypotheses:

RQ1: Is there a significant difference in 2-year completion rates between economically disadvantaged students and noneconomically disadvantaged students?

H₀₁: There is no significant difference in 2-year completion rates between economically disadvantaged students and noneconomically disadvantaged students.

RQ2: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who participated in an AP mathematics class (AP statistics, AP calculus AB, or AP calculus BC) and economically disadvantaged students who did not participate in an AP mathematics class?

- H₀2: There is no significant difference in the 2-year completion rates between economically disadvantaged students who participated in an AP mathematics class (AP statistics, AP calculus AB, or AP calculus BC) and economically disadvantaged students who did not participate in an AP mathematics class.
- RQ3: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who received AP credit in a mathematics class (AP statistics, AP calculus AB, or AP calculus BC) and economically disadvantaged students who did not receive AP credit in a mathematics class?
- H₀3: There is no significant difference in the 2-year completion rates between economically disadvantaged students who received AP credit in a mathematics class and economically disadvantaged students who did not receive AP credit in a mathematics class.
- RQ4: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who participated in an AP English class (AP English Language and Composition or AP English Literature and Composition) and economically disadvantaged students who did not participate in an AP English class?
- H₀4: There is no significant difference in the 2-year completion rates between economically disadvantaged students who participated in an AP English class (AP English Language and Composition or AP English Literature and Composition) and economically disadvantaged students who did not participate in an AP English class.

RQ5: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who received AP credit in English class (AP English Language and Composition or AP English Literature and Composition) and economically disadvantaged students who did not receive AP credit in an English class?

H₀₅: There is no significant difference in the 2-year completion rates between economically disadvantaged students who received AP credit in English class (AP English Language and Composition or AP English Literature and Composition) and economically disadvantaged students who did not receive AP credit in an English class.

RQ6: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who participated in any dual enrollment credit course and noneconomically disadvantaged students who participated in a dual enrollment course?

H₀₆: There is not a significant difference in the 2-year completion rates between economically disadvantaged students who participated in any dual enrollment credit course and noneconomically disadvantaged students who participated in a dual enrollment course.

RQ7: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who took a dual enrollment course and received credit and economically disadvantaged students who took a dual enrollment course and did not receive credit?

H₀₇: There is no significant difference in the 2-year completion rates between economically disadvantaged students who received dual enrollment credit

in any course and economically disadvantaged students who did not receive dual enrollment credit.

RQ8: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who participated in any dual enrollment course and economically disadvantaged students who participated in an AP course in English or mathematics?

H₀8: There is not a significant difference in the 2-year completion rates between economically disadvantaged students who participated in any dual enrollment course and economically disadvantaged students who participated in an AP course in English or mathematics.

RQ9: Is there a significant difference in the 2-year completion rates between economically disadvantaged students who received dual enrollment credit and economically disadvantaged students who received AP credit in English or mathematics?

H₀9: There is no significant difference in 2-year completion rates between economically disadvantaged students who received dual enrollment credit and economically disadvantaged students who received AP credit in English or mathematics.

Sample

The sample for this study consisted of students who entered a Tennessee community college or Tennessee public university in the Fall of 2015. These students had taken at least one Advanced Placement or dual enrollment course in a Tennessee high school. In addition, the sample for this study was economically disadvantaged using the Tennessee method for direct certification when taking an Advanced Placement or dual enrollment course. Each member of the sample was grouped into one or more of four categories:

1. Students who entered with an Advanced Placement mathematics credit;
2. Students who entered with an Advanced Placement English credit;
3. Students who entered with a dual enrollment credit;
4. Students who entered with neither an Advanced Placement or dual enrollment credit;
5. Students who were economically disadvantaged.

The sample was also categorized into two other distinct groups: those who entered a Tennessee community college or public university in Fall 2015 and those who completed a course of study within two years.

Data Source

After receiving approval from the researcher's dissertation committee and the East Tennessee State University Institutional Research Board (IRB), the researcher worked with the Tennessee Department of Education to obtain the data. The data used in this study were existing data from the Tennessee Department of Education. All personal identifiers were removed from the data before the researcher obtained the data to insure confidentiality for all participants. The department does not make student-level data available to the public. Access to data is permitted by statute and federal law, privacy concerns, security procedures, and the ability of the department staff to monitor the data release and the perceived benefits. The researcher used the data request form on the department of education website to obtain the data. The 2-year completion rate data was supplied solely by the Tennessee Department of Education. The department receives this data from P-20 and The Tennessee Higher Education Commission

(THEC). The P-20 data is longitudinal data that follows students from Kindergarten through postsecondary.

Data Analysis

Each research question was addressed by the use of chi-square test of independence. The chi-square test was an appropriate statistical measure because all data are nominal. More specifically two-way contingency tables were used for the nine research questions. All data were analyzed at the 0.05 level of significance. The independent variables for this study were Advanced Placement credits received in AP English Language and Composition, AP English Literature and Composition, AP Statistics, AP Calculus AB, AP Calculus BC, and dual enrollment credit received in any course. The dependent variables for this study were economically disadvantaged status as defined by the Tennessee Department of Education and 2-year completion. All data were analyzed by using the Statistical Program for Social Science (SPSS) software.

Chapter Summary

This chapter provides the reason the research was conducted, research design, population studied, data collection, and data analysis. This quantitative, quasi-experimental study used a series of chi-square tests to determine if economically disadvantaged students who earned Advanced Placement and/or dual enrollment credit had a higher 2-year completion rate at a Tennessee community college or public university than economically disadvantaged students who did not have Advanced Placement and/or dual enrollment credits. The results are presented in Chapter 4.

CHAPTER 4

FINDINGS

The purpose of this study was to measure the possible relationship between Advanced Placement and dual enrollment courses for economically disadvantaged students on 2-year completion rates at public Tennessee higher education institutions. A quantitative, quasi experimental, comparative design was used to analyze secondary data to determine if there is a relationship between Advanced Placement, dual enrollment courses, and 2-year completion rates for students in Tennessee community colleges and public universities. The sample for this study consisted of students who entered a Tennessee community college or Tennessee public university in the Fall of 2015. These students had taken at least one Advanced Placement or dual enrollment course in a Tennessee high school. In addition, the sample for this study was economically disadvantaged using the Tennessee method for direct certification when taking an Advanced Placement or dual enrollment course. The data used in this study were existing data from the Tennessee Department of Education. All personal identifiers were removed from the data before the researcher obtained the data to insure confidentiality for all participants.

Nine research questions were developed to guide the study. A chi square test was used for each of the nine research questions and corresponding null hypotheses. The research questions, and null hypotheses, data, and data analysis are shown here.

Research Question 1

Is there a significant difference in 2-year completion rates between economically disadvantaged students and noneconomically disadvantaged students?

H₀₁: There is no significant difference in 2-year completion rates between economically disadvantaged students and noneconomically disadvantaged students.

A two-way contingency table analysis was conducted to evaluate whether there is a significant difference between 2-year completion rates of students and economically disadvantaged status. The two variables were 2-year completion rates with two levels (complete and not complete) and economically disadvantaged status with two levels (economically disadvantaged and noneconomically disadvantaged). Two-year completion rates and economically disadvantaged status were found to be significantly related, Pearson $\chi^2 (1, N = 69,944) = 495.323, p < .001$, Cramer's $V = .084$. The completion rate for economically disadvantaged students is 2.9% and the completion rate for noneconomically disadvantaged students is 6.4%. Therefore, the null hypothesis is rejected. In general, economically disadvantaged students are significantly less likely to attain completion in two years than noneconomically disadvantaged students.

Figure 1 shows the number of students who are economically disadvantaged who completed in two years versus the number of noneconomically disadvantaged students who completed in two years as well as the number of economically disadvantaged students who did not complete in two years versus the number of noneconomically disadvantaged students who did not complete in two years.

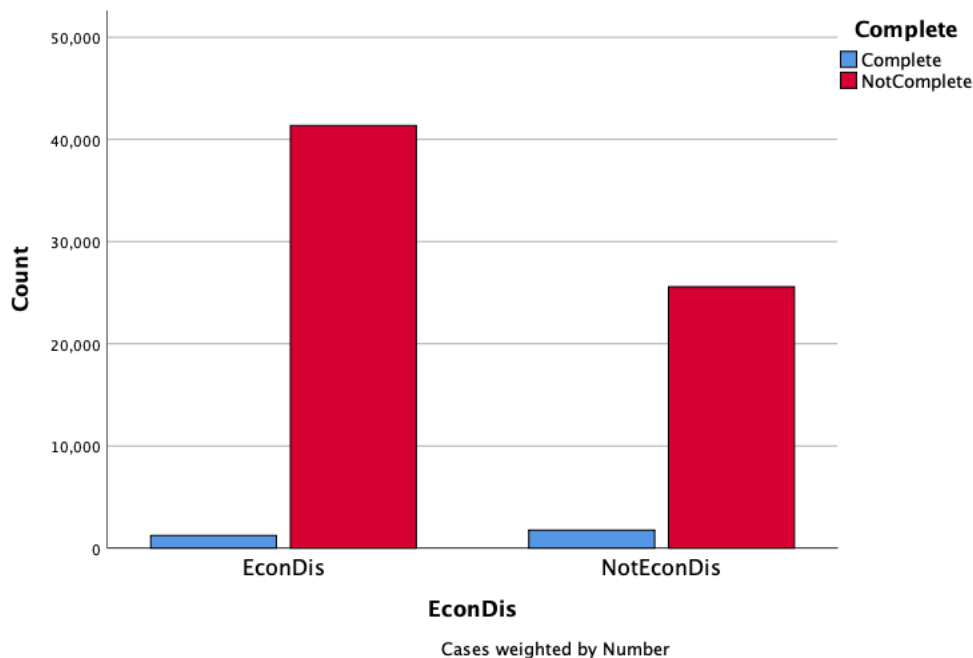


Figure 1. The number of economically disadvantaged and noneconomically disadvantaged students who completed in two years

Research Question 2

Is there a significant difference in the 2-year completion rates between economically disadvantaged students who participated in an AP mathematics class (AP statistics, AP calculus AB, or AP calculus BC) and economically disadvantaged students who did not participate in an AP mathematics class?

H₀2: There is no significant difference in the 2-year completion rates between economically disadvantaged students who participated in an AP mathematics class (AP statistics, AP calculus AB, or AP calculus BC) and economically disadvantaged students who did not participate in an AP mathematics class.

A two-way contingency table analysis was conducted to evaluate whether there is a significant difference between 2-year completion rates of economically disadvantaged students who participated in AP mathematics class and economically disadvantaged students who did not participate in AP mathematics class. The two variables were 2-year completion rates for economically disadvantaged students with two levels (complete and not complete) and AP mathematics participation with two levels (participated in AP math and did not participate in AP math). Two-year completion rates for economically disadvantaged students and participation in AP math classes were not found to be significantly related, Pearson $\chi^2 (1, N = 35,504) = .936$, $p = .333$, Cramer's $V = .005$. The completion rate for economically disadvantaged students who participated in AP math classes is 22%. The completion rate for economically disadvantaged students who did not participate in AP math classes is 27%. Therefore, the null hypothesis is retained. In general, economically disadvantaged students who participate in AP math classes are somewhat, but not significantly, more likely than economically disadvantaged students who did not participate in AP math classes to complete a degree in two years.

Figure 2 shows the number of economically disadvantaged students who participated in an AP math class versus the number of economically disadvantaged students who did not participate in an AP math class as well as the number of those students who completed in two years.

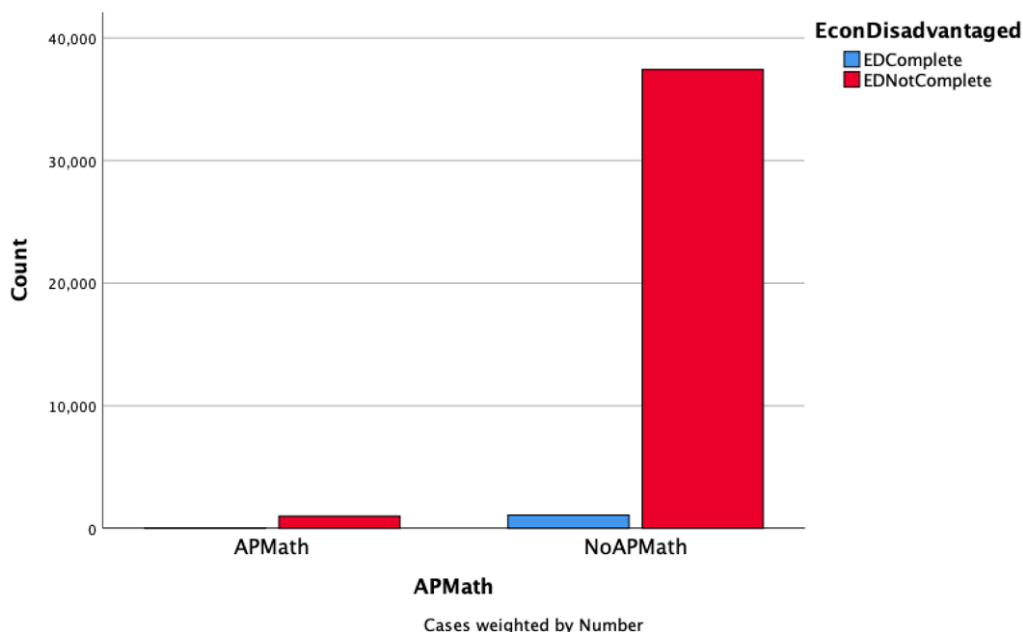


Figure 2. The number of economically disadvantaged students who participated in an AP math class and completed in two years

Research Question 3

Is there a significant difference in the 2-year completion rates between economically disadvantaged students who received AP credit in a mathematics class (AP statistics, AP calculus AB, or AP calculus BC) and economically disadvantaged students who did not receive AP credit in a mathematics class?

H₀3: There is no significant difference in the 2-year completion rates between economically disadvantaged students who received AP credit in a mathematics class and economically disadvantaged students who did not receive AP credit in a mathematics class.

A two-way contingency table analysis was conducted to evaluate whether there is a significant difference between 2-year completion rates of economically disadvantaged students who received credit in an AP mathematics class and economically disadvantaged students who did not receive credit in an AP mathematics class. The two variables were 2-year completion rates for economically disadvantaged students with two levels (complete and not complete) and AP mathematics credit with two levels (received credit in AP math and did not receive credit in AP math). Two-year completion rates for economically disadvantaged students and receiving credit in AP math classes were found to be significantly related, Pearson $\chi^2 (1, N = 1,015) = 47.769, p < .001$, Cramer's $V = .217$. The completion rate for economically disadvantaged students who received an AP math credit is 6.8%. The completion rate for economically disadvantaged students who did not receive an AP math credit is 0%. Therefore, the null hypothesis is rejected. In general, economically disadvantaged students who receive credit in an AP math class are significantly more likely than economically disadvantaged students who did not receive credit in an AP math class to complete a degree in two years.

Figure 3 shows the number of economically disadvantaged students who received an AP math credit versus those who did not receive an AP math credit as well as the number of those students who did and did not complete in two years.

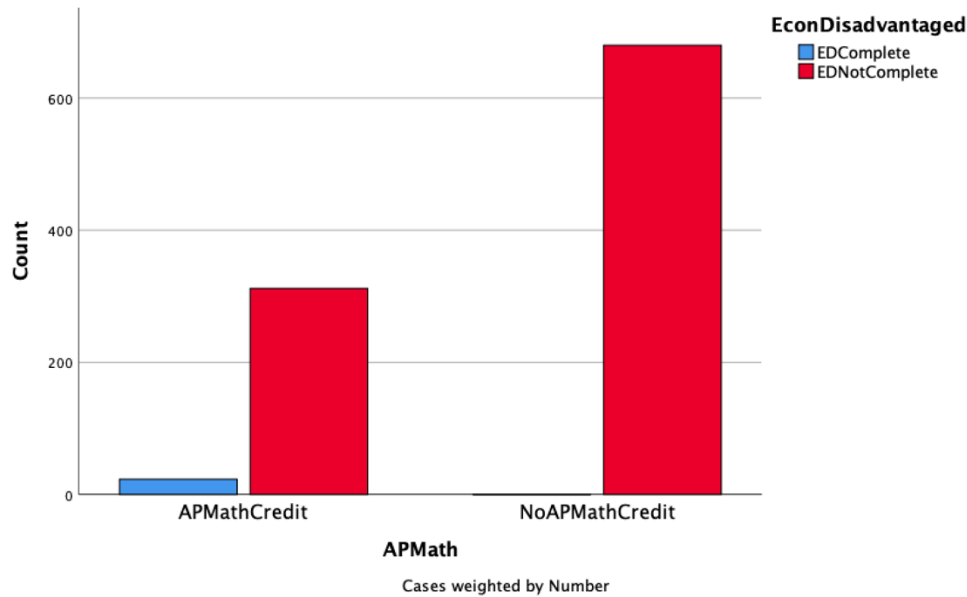


Figure 3. The number of economically disadvantaged students who received an AP math credit and completed in two years

Research Question 4

Is there a significant difference in the 2-year completion rates between economically disadvantaged students who participated in an AP English class (AP English Language and Composition or AP English Literature and Composition) and economically disadvantaged students who did not participate in an AP English class?

H₀4: There is no significant difference in the 2-year completion rates between economically disadvantaged students who participated in an AP English class (AP English Language and Composition or AP English Literature and Composition) and economically disadvantaged students who did not participate in an AP English class.

A two-way contingency table analysis was conducted to evaluate whether there is a significant difference between 2-year completion rates of economically disadvantaged students who participated in AP English class and economically disadvantaged students who did not participate in AP English class. The two variables were 2-year completion rates for economically disadvantaged students with two levels (complete and not complete) and AP English participation with two levels (participated in AP English and did not participate in AP English). Two-year completion rates for economically disadvantaged students and participation in AP English classes were found to be significantly related, Pearson $\chi^2 (1, N = 41,177) = 19.543, p < .001$, Cramer's $V = .022$. The completion rate for economically disadvantaged students who participate in AP English classes is 4.2%. The completion rate for economically disadvantaged students who do not participate in AP English classes is 2.7%. Therefore, the null hypothesis is rejected. In general, economically disadvantaged students who participate in AP English classes are significantly more likely than economically disadvantaged students who did not participate in AP English classes to complete a degree in two years.

Figure 4 shows the number of economically disadvantaged students who participated in an AP English class versus the number of economically disadvantaged students who did not participate in an AP English class as well as the number of those students who completed in two years.

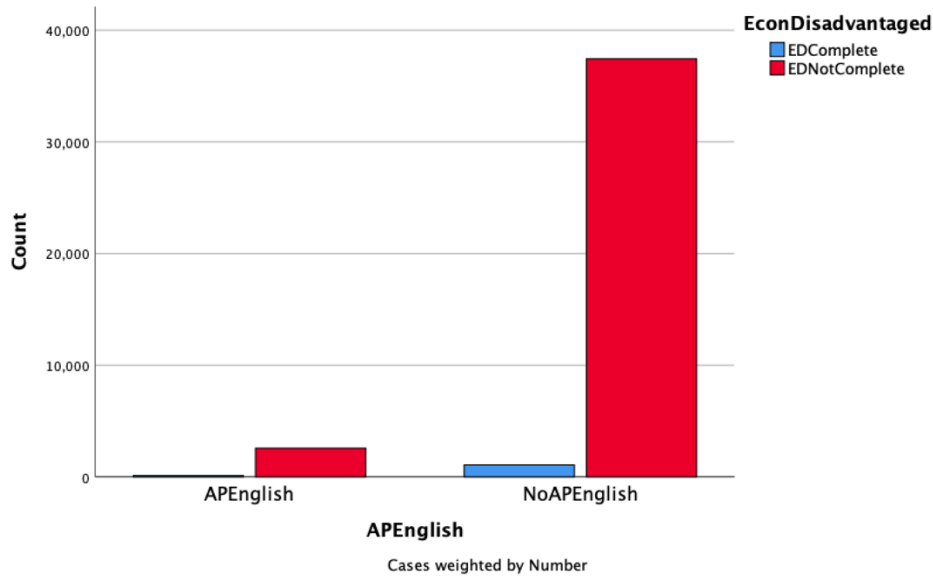


Figure 4. The number of economically disadvantaged students who participated in an AP English class and completed in two years

Research Question 5

Is there a significant difference in the 2-year completion rates between economically disadvantaged students who received AP credit in English class (AP English Language and Composition or AP English Literature and Composition) and economically disadvantaged students who did not receive AP credit in an English class?

H05: There is no significant difference in the 2-year completion rates between economically disadvantaged students who received AP credit in English class (AP English Language and Composition or AP English Literature and Composition) and economically disadvantaged students who did not receive AP credit in an English class.

A two-way contingency table analysis was conducted to evaluate whether there is a significant difference between 2-year completion rates of economically disadvantaged students who received credit in an AP English class and economically disadvantaged students who did not receive credit in an AP English class. The two variables were 2-year completion rates for economically disadvantaged students with two levels (complete and not complete) and AP English credit with two levels (received credit in AP English and did not receive credit in AP English). Two-year completion rates for economically disadvantaged students and receiving credit in AP English classes were found to be significantly related, Pearson $\chi^2 (1, N = 2,688) = 37.949, p < .001$, Cramer's $V = .119$. The completion rate for economically disadvantaged students who receive credit in an AP English class is 7.4% The completion rate for economically disadvantaged students who did not receive credit in an AP English class is 2.4%. Therefore, the null hypothesis is rejected. In general, economically disadvantaged students who receive credit in an AP English class are significantly more likely than economically disadvantaged students who did not receive credit in an AP English class to complete a degree in two years.

Figure 5 shows the number of economically disadvantaged students who received an AP English credit versus those who did not receive an AP English credit as well as the number of those students who did and did not complete in two years.

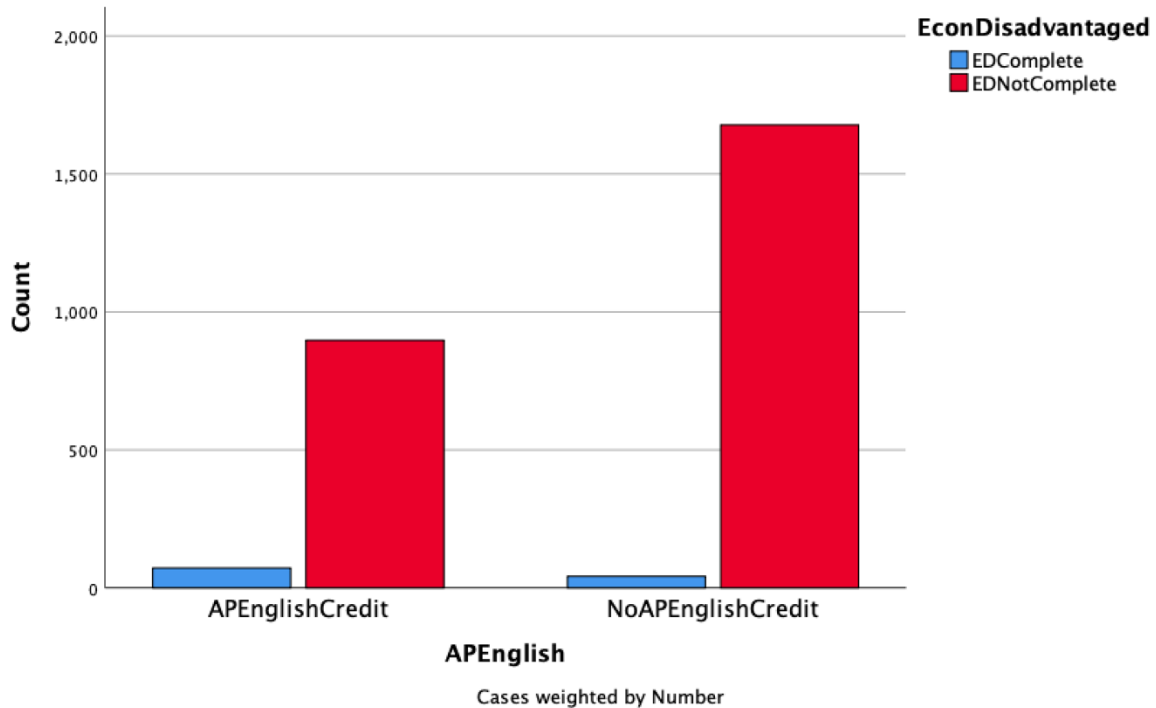


Figure 5. The number of economically disadvantaged students who received an AP English credit and completed in two years

Research Question 6

Is there a significant difference in the 2-year completion rates between economically disadvantaged students who participated in any dual enrollment credit course and noneconomically disadvantaged students who participated in a dual enrollment course?

H₀₆: There is not a significant difference in the 2-year completion rates between economically disadvantaged students who participated in any dual enrollment credit course and noneconomically disadvantaged students who participated in a dual enrollment course.

A two-way contingency table analysis was conducted to evaluate whether there is a significant difference between 2-year completion rates of economically disadvantaged students and noneconomically disadvantaged students who participated in a dual enrollment course. The two variables were 2-year completion rates with two levels (complete and not complete) and economically disadvantaged status with two levels (economically disadvantaged and noneconomically disadvantaged). Two-year completion rates and economically disadvantaged status were found to be significantly related, Pearson $\chi^2 (1, N = 34,477) = 432.143, p < .001$, Cramer's $V = .112$. The completion rate for economically disadvantaged students who participated in dual enrollment is 2.8%. The completion rate for noneconomically disadvantaged students who participated in dual enrollment is 7.8%. Therefore, the null hypothesis is rejected. In general, economically disadvantaged students who participated in a dual enrollment course are significantly less likely to attain completion in two years than noneconomically disadvantaged students.

Figure 6 shows the number of economically disadvantaged students who participated in a dual enrollment course versus the number of noneconomically disadvantaged students who participated in a dual enrollment course as well as the number of those students who completed in two years.

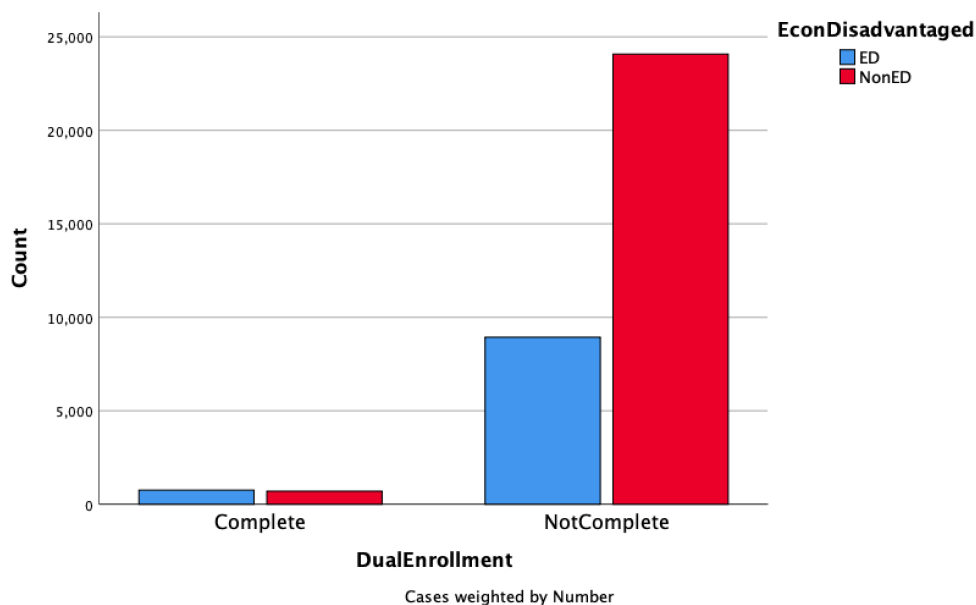


Figure 6. The number of economically and noneconomically disadvantaged students who participated in dual enrollment courses and completed in two years

Research Question 7

Is there a significant difference in the 2-year completion rates between economically disadvantaged students who took a dual enrollment course and received credit and economically disadvantaged students who took a dual enrollment course and did not receive credit?

H₀7: There is no significant difference in the 2-year completion rates between economically disadvantaged students who received dual enrollment credit in any course and economically disadvantaged students who did not receive dual enrollment credit.

A two-way contingency table analysis was conducted to evaluate whether there is a significant difference between 2-year completion rates of economically disadvantaged students

who received credit in dual enrollment course and economically disadvantaged students who did not receive credit in dual enrollment course. The two variables were 2-year completion rates for economically disadvantaged students with two levels (complete and not complete) and dual enrollment credit with two levels (received credit and did not receive credit). Two-year completion rates for economically disadvantaged students and receiving credit in dual enrollment courses were found to be significantly related, Pearson $\chi^2 (1, N = 8,926) = 27.725, p < .001$, Cramer's $V = .056$. The completion rate for economically disadvantaged students who receive credit in a dual enrollment course is 3.6%. The completion rate for economically disadvantaged students who did not receive credit in a dual enrollment course is 1.7%. Therefore, the null hypothesis is rejected. In general, economically disadvantaged students who receive credit in a dual enrollment course are significantly more likely than economically disadvantaged students who did not receive credit in a dual enrollment course to complete a degree in two years.

Figure 7 shows the number of economically disadvantaged students who received credit in a dual enrollment course versus the number of economically disadvantaged students who did not receive credit in a dual enrollment course as well as the number of those students who completed in two years.

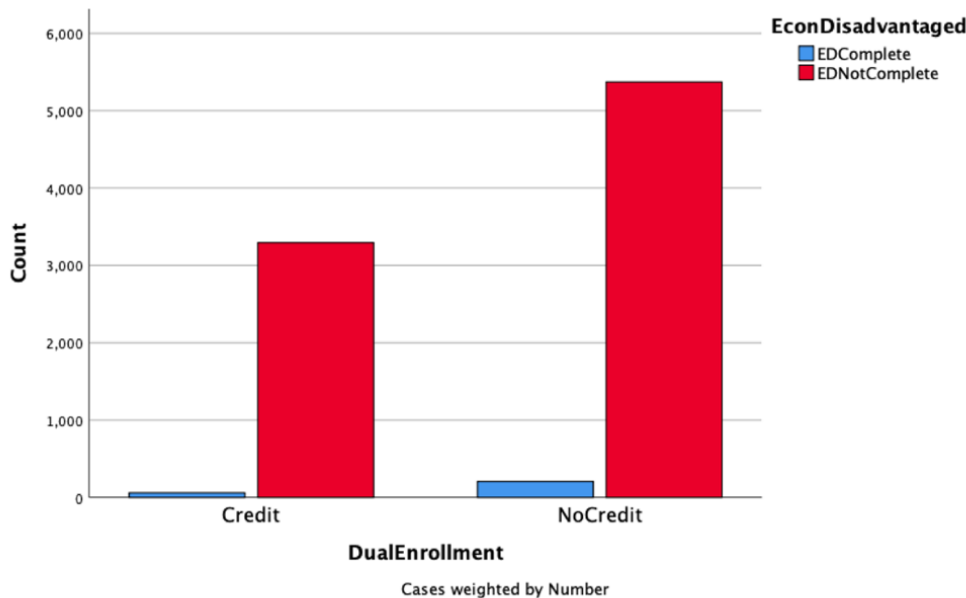


Figure 7. The number of economically disadvantaged students who received credit in a dual enrollment course and completed in two years

Research Question 8

Is there a significant difference in the 2-year completion rates between economically disadvantaged students who participated in any dual enrollment course and economically disadvantaged students who participated in an AP course in English or mathematics?

H₀₈: There is not a significant difference in the 2-year completion rates between economically disadvantaged students who participated in any dual enrollment course and economically disadvantaged students who participated in an AP course in English or mathematics.

A two-way contingency table analysis was conducted to evaluate whether there is a significant difference between 2-year completion rates of economically disadvantaged students who participated in dual enrollment course and economically disadvantaged students who

participated in an AP math or English class. The two variables were 2-year completion rates for economically disadvantaged students with two levels (complete and not complete) and participation with two levels (participated in dual enrollment and participated in AP math or English). Two-year completion rates for economically disadvantaged students and participating in dual enrollment courses in AP math or English classes were found to be significantly related, Pearson $\chi^2 (1, N = 13,398) = 74.079, p < .001$, Cramer's $V = .074$. The completion rate for students who participated in dual enrollment is 7.9% and the completion rate for students who participated in AP is 3.7%. Therefore, the null hypothesis is rejected. In general, economically disadvantaged students who participate in a dual enrollment course are significantly more likely than economically disadvantaged students who participate in an AP math or English class to complete a degree in two years.

Figure 8 shows the number of economically disadvantaged students who participated in a dual enrollment course versus the number of economically disadvantaged students who participated in an AP math or English class as well as the number of those students who completed in two years.

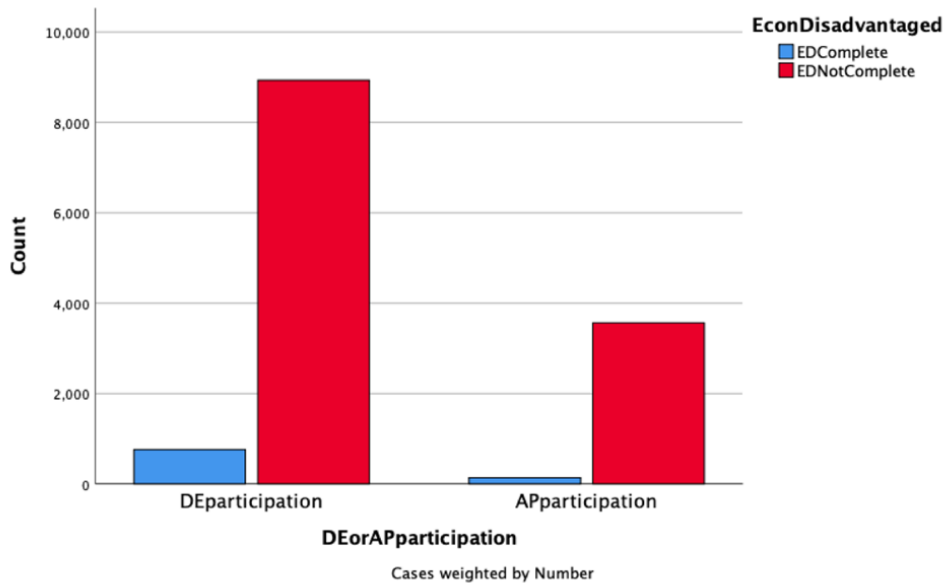


Figure 8. The number of economically disadvantaged students who participated in dual enrollment or AP courses and completed in two years

Research Question 9

Is there a significant difference in the 2-year completion rates between economically disadvantaged students who received dual enrollment credit and economically disadvantaged students who received AP credit in English or mathematics?

H₀9: There is no significant difference in 2-year completion rates between economically disadvantaged students who received dual enrollment credit and economically disadvantaged students who received AP credit in English or mathematics.

A two-way contingency table analysis was conducted to evaluate whether there is a significant difference between 2-year completion rates of economically disadvantaged students who received credit in a dual enrollment course and economically disadvantaged students who

received credit in an AP math or English class. The two variables were 2-year completion rates for economically disadvantaged students with two levels (complete and not complete) and receiving credit with two levels (received credit in dual enrollment course and received credit in AP math or English). Two-year completion rates for economically disadvantaged students and receiving credit in a dual enrollment course or an AP math or English classes were found to be significantly related, Pearson $\chi^2(1, N = 4,655) = 91.108, p < .001$, Cramer's $V = .141$. The completion rate for economically disadvantaged students who receive credit in a dual enrollment course is 7.2%. The completion rate for economically disadvantaged students who receive credit in an AP class is 1.7%. Therefore, the null hypothesis is rejected. In general, economically disadvantaged students who receive credit in a dual enrollment course are significantly more likely than economically disadvantaged students who receive credit in an AP math or English class to complete a degree in two years.

Figure 9 shows the number of economically disadvantaged students who earned credit in a dual enrollment course versus the number of economically disadvantaged students who earn credit in an AP math or English course as well as the number of those students who completed in two years.

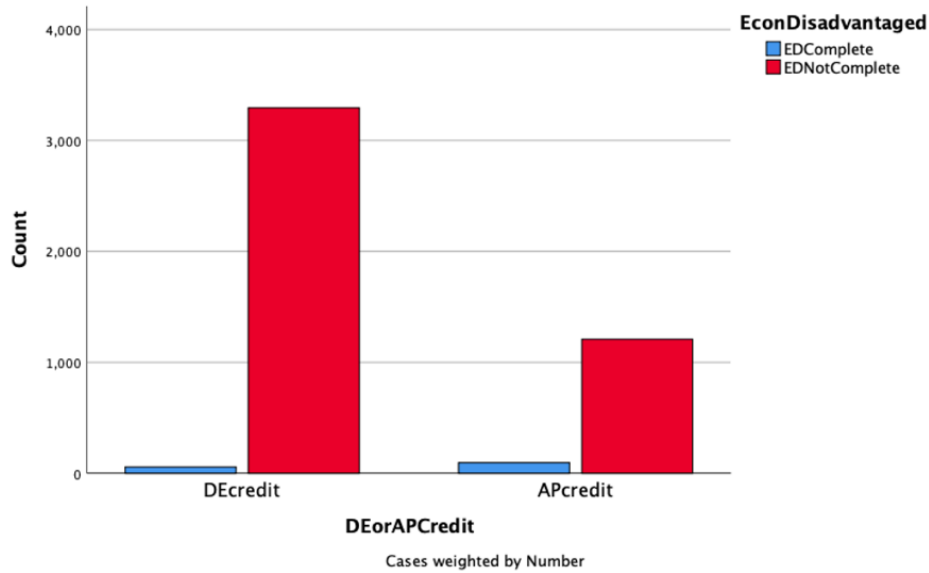


Figure 9. The number of economically disadvantaged students who received credit in a dual enrollment course or AP math or English course and completed in two years

Chapter Summary

Chapter 4 presents the analysis of data contained from the Tennessee Department of Education. The data for students who participated in AP math or English courses, dual enrollment courses, who had an economically disadvantaged status, and who graduated in 2015 from a Tennessee high school and had 2-year completion rate results at public Tennessee higher education institution. The researcher observed that economically disadvantaged students are significantly less likely to attain completion in two years as compared to noneconomically disadvantaged students. The researcher also observed that economically disadvantaged students who receive credit in an AP math class are significantly more likely than economically disadvantaged students who did not receive credit in an AP math class to complete a degree in two years. However, students who participate in an AP math class are somewhat, but not

significantly, more likely to complete a degree in two years. Economically disadvantaged students who participate in AP English classes are significantly more likely than economically disadvantaged students who did not participate in AP English classes to complete a degree in two years, and students who receive credit in AP English are also significantly more likely to receive credit in two years. The researcher also observed that economically disadvantaged students who participated in a dual enrollment course are significantly less likely to attain completion in two years than noneconomically disadvantaged students. Economically disadvantaged students who receive credit in a dual enrollment course are significantly more likely than economically disadvantaged students who did not receive credit in a dual enrollment course to complete a degree in two years. When comparing Advanced Placement courses with dual enrollment courses, the researcher found that economically disadvantaged students who participate in a dual enrollment course are significantly more likely than economically disadvantaged students who participate in an AP math or English class to complete a degree in two years. In addition, economically disadvantaged students who receive credit in a dual enrollment course are significantly more likely than economically disadvantaged students who receive credit in an AP math or English class to complete a degree in two years.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter contains a summary of the findings, conclusions, and recommendation for future research. Since 2015 there has been an emphasis on promoting Advanced Placement and dual enrollment in Tennessee public schools based on the accountability requirements. In addition, there has been an increased emphasis on college enrollment and completion due to Tennessee Promise and the Drive to 55 Initiative. Finally, access and success gaps persist for economically disadvantaged students in Tennessee. Thus, this study served to measure the possible relationship between Advanced Placement and dual enrollment courses for economically disadvantaged students on 2-year completion rates at public Tennessee higher education institutions.

Discussion and Conclusions

Research Questions 1, 2, 3, 4, and 5 were focused on economically disadvantaged students who participated in or earned credit in Advanced Placement math or English courses. Economically disadvantaged students are significantly less likely to attain completion in 2 years than noneconomically disadvantaged students. This is relevant because students who take at least one EPSO are more likely to enroll in postsecondary. This is true for noneconomically disadvantaged and economically disadvantaged students. Among economically disadvantaged students without an EPSO only 49% enroll in postsecondary compared to 66% of economically disadvantaged students with an EPSO (TDOE, 2017d). Economically disadvantaged students who take EPSO courses (66%) enroll in postsecondary institutions at similar rates to noneconomically disadvantaged students who do not take EPSO courses (64%). Table 1 shows

the number of students who are economically disadvantaged and who are not economically disadvantaged and with the number of students who have 2-year completion.

Table 1.

The Number of Students With and Without Completion

Student Description	Number of Students
Economically Disadvantaged with 2-year Completion	1,249
Noneconomically Disadvantaged with 2-year Completion	1,757
Economically Disadvantaged without 2-year Completion	41,365
Noneconomically Disadvantaged without 2-year Completion	25,573

Research Questions 2 and 3 were focused on economically disadvantaged students who participated in or earned credit in Advanced Placement math courses. This researcher found that economically disadvantaged students who participate in AP math classes are somewhat, but not significantly, more likely than economically disadvantaged students who did not participate in AP math classes to complete a degree in 2 years. However, economically disadvantaged students who receive credit in an AP math class are significantly more likely than economically disadvantaged students who did not receive credit in an AP math class to complete a degree in 2 years. Table 2 shows the number of economically disadvantaged students who participated in or earned credit in AP math and their completion rates.

Table 2.

The Number of Economically Disadvantaged Students who Participated in or Earned Credit in AP Math and Their Completion Rates

Student Description	Number of Students with 2-year Completion	Number of Students without 2-year Completion
Economically Disadvantaged and No AP Math	1,066	37,423
Economically Disadvantaged and AP Math Participation	23	992
Economically Disadvantaged with no AP Math Credit	0	680
Economically Disadvantaged with AP Math Credit	23	312

Research Questions 4 and 5 were focused on economically disadvantaged students who participated in or earned credit in Advanced Placement English courses. The comparison of participation and earning credit is relevant because there is some evidence that economically disadvantaged students are less likely to take exams to earn credits for early postsecondary opportunities and credit articulation discrepancies between community colleges and Tennessee Centers for Applied Technology (TCATs) with 4-year universities. (TDOE, 2017d). This researcher found that economically disadvantaged students who participate in AP English classes are significantly more likely than economically disadvantaged students who did not participate in AP English classes to complete a degree in 2 years. It was also observed that economically disadvantaged students who receive credit in an AP English class are significantly more likely than economically disadvantaged students who did not receive credit in an AP English class to complete a degree in 2 years. The Advanced Placement courses bring rigor into the high school curriculum by fostering critical thinking skills, which are often required in college courses (Venzia & Jaeger, 2013). Approximately 94% of college students believe that taking challenging

courses, such as AP, in high school would better prepare them for college courses (Cassidy et al., 2010). Table 3 shows the number of economically disadvantaged students who participated in or earned credit in AP English and their completion rates.

Table 3.

The Number of Economically Disadvantaged Students who Participated in or Earned Credit in AP English and Their Completion Rates

Student Description	Number of Students with 2-year Completion	Number of Students without 2-year Completion
Economically Disadvantaged and No AP English	1,066	37,423
Economically Disadvantaged and AP English Participation	114	2,574
Economically Disadvantaged with no AP English Credit	42	1,677
Economically Disadvantaged with AP English Credit	72	897

Research Questions 6 and 7 were focused on economically disadvantaged students who participated in or earned credit in dual enrollment courses. Economically disadvantaged students who participated in a dual enrollment course are significantly less likely to attain completion in 2 years than noneconomically disadvantaged students. Research supports that dual enrollment students are more likely to attain a college degree and dual enrollment courses help to reduce the overall costs of college and may increase the number of low socioeconomic students who can attend or complete college (U.S. Department of Education, 2017). Table 4 shows the number of economically disadvantaged and noneconomically disadvantaged students who participated in dual enrollment courses along with the number of students who have 2-year completion.

Table 4.

The Number of Students With and Without Completion who Participated in Dual Enrollment Courses

Student Description	Number of Students with 2-year Completion	Number of Students without 2-year Completion
Economically Disadvantaged and Participated in Dual Enrollment	762	8,933
Noneconomically Disadvantaged and Participated in Dual Enrollment	703	24,079

Economically disadvantaged students who receive credit in a dual enrollment course are significantly more likely than economically disadvantaged students who did not receive credit in a dual enrollment course to complete a degree in 2 years. This is related to the research of Struhl and Vargas (2012), who found that dual enrollment is a strategy for improving postsecondary success. The study focused on over 32,000 students from the 2004 graduating class in Texas. Half of the students in the study completed at least one dual enrollment course before graduation and the other half did not. The half who did take a dual enrollment course were “significantly more likely to attend college, persist in college, and complete an associate’s degree or higher within six years” (Struhl & Vargas, 2012). Additionally, An (2013) examined whether dual enrollment serves as a means to improve college degree attainment as well as whether these programs benefit students from low socio-economic backgrounds. He found that dual enrollment positively impacts degree attainment for low socio-economic students. Table 5 shows the number of economically disadvantaged students who did or did not receive credit in dual enrollment courses along with the number of students who have 2-year completion.

Table 5.

The Number of Students With and Without Completion Who Earned Credit in Dual Enrollment Courses

Student Description	Number of Students with 2-year Completion	Number of Students without 2-year Completion
Economically Disadvantaged and Earned Credit in Dual Enrollment	58	3,293
Economically Disadvantaged and Did Not Earn Credit in Dual Enrollment	205	5,370

Research Question 8 was focused on economically disadvantaged students who took dual enrollment courses or Advanced Placement (math or English) courses and their completion rates. This researcher found that economically disadvantaged students who participate in a dual enrollment course are significantly more likely than economically disadvantaged students who participate in an AP math or English class to complete a degree in two years. Table 6 shows the number of economically disadvantaged students who participated in a dual enrollment course, or AP math, or AP English course and their completion rates.

Table 6.

Economically Disadvantaged Students Who Participated in a Dual Enrollment or AP Course and Completion Rates

Student Description	Number of Students with 2-year Completion	Number of Students without 2-year Completion
Economically Disadvantaged and Participated in Dual Enrollment	762	8,933
Economically Disadvantaged and Participated in AP (math or English)	137	3,566

Research Question 9 was focused on economically disadvantaged students who earned credit in dual enrollment courses or Advanced Placement (math or English) courses and their completion rates. This researcher found economically disadvantaged students who receive credit in a dual enrollment course are significantly more likely than economically disadvantaged students who receive credit in an AP math or English class to complete a degree in two years. Table 7 shows the number of economically disadvantaged students who earned credit in a dual enrollment course, or AP math, or AP English course and their completion rates.

Table 7.

Economically Disadvantaged Students Who Earned Credit in a Dual Enrollment or AP Course and Completion Rates

Student Description	Number of Students with 2-year Completion	Number of Students without 2-year Completion
Economically Disadvantaged and Earned Credit in Dual Enrollment	58	3,293
Economically Disadvantaged and Earned Credit in AP (math or English)	95	1,209

Implications for Practice

Early Post Secondary Opportunities (EPSOs) are essential for students' post secondary success. Participation in and earning credit in Advanced Placement math or English or dual enrollment courses can be associated with higher 2-year completion rates, especially for economically disadvantaged students. The following implication for practice emerged as a result of the current study:

1. States and districts should expand funding opportunities for both dual enrollment and Advanced Placement courses. Participants in this study who participated in or earned credit in either dual enrollment or Advanced Placement math or English had higher 2-year completion rates compared to their peers who did not participate.
2. States and districts should incentivize economically disadvantaged students to participate in dual enrollment courses and to take the Advanced Placement exams.
3. District and school administrators should continue to expand equity and access measures for students, especially economically disadvantaged students. They should examine their systems to ensure that no bias exists and that students of poverty do not have limited access to higher level coursework. In addition, they should examine their systems to ensure that additional supports are in place for students of poverty in order to meet their basic needs so that they can fully participate in their education.
4. Secondary administrators and high school principals should include dual enrollment and Advanced Placement courses in their master schedules.

5. School counselors and teachers should encourage all students, but especially economically disadvantaged students, to participate in dual enrollment or Advanced Placement courses.
6. High school teachers who teach Advanced Placement and dual enrollment courses should understand the criteria for acquiring credit in the course, incorporate test-taking strategies in the course, and work with students to ensure they are well equipped to gain credit on the assessment.

Recommendations for Future Research

Based on the results of this study and the literature reviewed for this study, further research is needed to provide additional information on the benefits of dual enrollment and Advanced Placement courses for economically disadvantaged students. This study was not intended to determine the causation of the relationships, only that they do exist. The recommendations for future research include the following:

1. A qualitative study could be conducted in order to further investigate the characteristics of economically disadvantaged students that may or may not contribute to their 2-year completion.
2. Conduct similar research that includes all AP courses, not just AP English and AP mathematics.
3. Conduct follow up research using the same cohort of students to evaluate 3, 4, or 5-year completion.
4. Conduct research on the characteristics of instructor quality for AP and dual enrollment courses to investigate the impact on student success.

5. Investigate the grades students receive in AP or dual enrollment courses to determine if students are more likely to take additional AP or dual enrollment courses based on their success in previous courses.
6. Investigate other causes for student success in post-graduate institutions beyond taking EPSOs.

Chapter Summary

Chapter 5 includes an overview of the related literature, a statement of the problem that the research was analyzing, discussion and conclusions of the study, implications for practice, and recommendations for further research. The researcher found that participating in Advanced Placement English and dual enrollment increases 2-year completion rates. The researcher also found that earning credit in Advanced Placement math, English, and dual enrollment increases 2-year completion rates. It was found that there is not a significant difference between participation in Advanced Placement math and 2-year completion rates.

Several implications for practice were derived from this study including expanding funding for Advanced Placement and dual enrollment courses, expanding equity and access for economically disadvantaged students to participate in Advanced Placement and dual enrollment courses, and expanding opportunities in the master schedules of high schools for Advanced Placement and dual enrollment courses.

While the results of this study support much previous research, several recommendations for future research were presented. Further investigation is needed into student characteristics that contribute to 2-year completion beyond EPSOs. In addition, further research is needed to

determine if the quality of the instructor or student success in the course is related to post-secondary success.

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